

ECON 360: ECONOMETRICS

Contact information

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Office hours: Mon. 1:00-2:30pm and Wed. 2:30-4:00pm Converse 312

Class time: T/Th 10:00-11:20am
Class location: Beneski 107

Course description

Economists use empirical analysis to test how well economic theories match up with real-world data and to forecast future events. Econometrics, when used properly, gives us a precise estimate of how event x affects outcome y . For example, what is the impact of a job training program on an individual's wages? What is the effect of smaller classroom sizes on student achievement in reading and math? What is the expected growth rate of GDP based on past economic indicators? The answers to these questions drive policymakers' decisions. In this course, we will learn the fundamentals of econometrics, both theoretically and in practice, as well as how to assess the validity of empirical analysis. Economics majors will apply the concepts from this course to their senior thesis; non-majors will be able to critically analyze empirical studies and may even have the chance to conduct their own analysis in a future job. Perhaps more importantly, everyone will develop critical thinking and problem-solving skills in this challenging course.

Pre-requisites and Course Materials

Pre-requisites: At least a B in ECON 111 or B- in Economics 200-290, Math 111

If you do not meet these pre-requisites, speak to me immediately.

Textbook: James Stock and Mark Watson, *Introduction to Econometrics*, 3rd edition.

Additional readings provided on the course Moodle website

STATA software: Available in the Economics Computer Lab or the Virtual Computing Lab (VCL), and on most public lab computers through KeyServer (???). Instructions on accessing STATA are posted on Moodle.

Grades

Your final grade will be determined by the following:

Midterm 1:	20%
Midterm 2:	20%
Midterm 3:	20%
Project:	20%
Problem sets:	15%
Class participation:	5%

Exams

Tentative exam dates can be found in the course schedule section in the Syllabus. All exams are in-class and mandatory. If you must miss an exam due to an emergency (such as hospitalization), let your instructor know as soon as possible. *If* you receive an official excuse, then your course grade will be based on your other completed work. If you do not receive an excuse, you will receive a zero on the missed exam. Exams will include a mix of multiple choice and short answer questions.

Project

In lieu of a final exam, you will work on a project throughout the semester, culminating in a short presentation/discussion and paper at the end of the semester. Presentations/discussions will take place during the final exam time scheduled by the Registrar's Office. You must attend class on all presentation days. The project grade will be based on your hypothesis, a review of the literature on your topic, the analysis you perform, and the quality of presentation/discussion. I will provide guidance and deadlines on these elements throughout the semester.

Problem sets

Problem sets will be collected approximately weekly, with some exceptions. They will be due at the **beginning** of class on the due date. Points will be deducted from late problem sets. I will allow a 10 minute grace period before considering a problem set late; however, if you consistently rely on this grace period, I will start counting problem sets as late. I encourage you to work with others on the problem sets, but all work that you turn in must be *your own*. I highly recommend discussing problems with classmates, then writing your solutions up later, independently. This ensures both that you know the material well enough to explain it on your own, and you do not unintentionally plagiarize (ie, passing another student's work off as your own- either verbatim or paraphrased). Problem sets must show all work on how you came to your answer. If you turn in a problem set that is too similar to another student's problem set or is not clearly in your own words, you will both receive zeros.

Attendance, Professional Conduct, and Intellectual Responsibility

The best way to learn the material for this course is through attending class. I expect you to have completed the assigned readings before coming to class. Lectures will go beyond the

readings and provide additional examples. I will also have helpful handouts on STATA to help you complete the problem sets. While there is no explicit component in the grade for attendance, I will be keeping track. Priority during office hours will be given to students who regularly attend and participate.

Attending class is not enough, however. You must also be actively engaged and conduct yourself in a professional manner. This means being on time, being respectful to your classmates, being prepared, not checking your phone during class, being aware of deadlines, etc. I make every effort to respect your time by not giving you busy work, using classtime effectively, and not keeping you late, so I expect you to respect my time. We will have a short break in class when you can use the rest room, check your phone, etc.

I expect you to abide by Amherst College's Statement of Intellectual Responsibility. All work you submit must be your own. This includes not copying from others on the problem sets, exams, and projects. Violations of the Statement of Intellectual Responsibility will result in an F in the course.

Extra help

We have four knowledgeable TAs for the semester: Hayes Honea, Conor Bronsdon, Hannah Firestone, and Jerry Chen. They will hold weekly office hours (time and location TBA) to help with problem sets and exam preparation. Please start your problem sets early and utilize this time!

You will also have access to a STATA TA, Diego Polanco, a graduate student from UMass Amherst. He is the TA for the entire Economics department, meaning he will also be helping students from other classes and senior thesis students. Please be respectful of his time, especially later in the semester. Diego will be available in the Economics computer lab. His office hours will be announced soon.

<i>W</i>	<i>Dates</i>	<i>Topics</i>	<i>Readings/Assignments</i>
I. Introduction to Probability and Statistics			
1	9/5 9/7	Econ questions; Course intro Intro to probability	Ch. 1; Finn and Achilles (1999); Dale and Krueger (2002) Ch. 2.1-2.2; Std dev: The forgotten statistical tool
2	9/12 9/14	Distributions Intro to sampling	Ch. 2.3-2.4; STATA access files Ch. 2.5-2.6; 3.1; Stata for Researchers: Do files; <i>PS 1 due</i>
3	9/19	Intro to hypothesis testing and CIs	Ch. 3.2-3.7; Hamermesh and Parker (2005)
II. Fundamentals of Regression Analysis			
	9/21	Bivariate linear regression	Ch. 4.1-4.2; Frankel and Romer (1999); <i>PS 2 due</i>
4	9/26 9/28	OLS assumptions CIs	Ch. 4.3-4.6; <i>Submit topic</i> Ch. 5.1-5.2; <i>PS 3 due</i>
5	10/3 10/5	Exam 1 Indicator vars, heteroskedasticity	Ch. 5.3-5.6; Evans et al (1999)
6	10/10 10/12	No class Multivariate regs	Ch. 6; <i>PS 4 due</i>
7	10/17 10/19	Hypothesis tests w/ multiple vars Meet with research librarian	Ch. 7 Bring laptop if possible; <i>PS 5 due</i>
8	10/24 10/26	Nonlinear regs Binary dependent variable	Ch. 8; Alpanda and Honig (2009) Ch. 11; <i>Submit Literature Review</i>
III. Threats to Validity and Solutions			
9	10/31 11/2	Validity Exam 2	Ch. 9; <i>PS 6 due</i>
10	11/7 11/9	Panel data Standard errors	Ch. 10.1-10.4; McKenzie et al. (2014) Ch. 10.5-10.7; <i>PS 7 due</i>
11	11/14 11/16	Instrumental variables Validity	Ch. 12.1-12.2; Acemoglu et al. (2001) Ch. 12.3-12.6; <i>PS 8 due</i>
Thanksgiving Break			
IV. Time Series			
12	11/28 11/30	Time series Non-stationarity	Ch. 14.1-14.4; <i>Submit summary statistics, initial results</i> Ch. 14.5-14.8; <i>PS 9 due</i>
V. Applications			
13	12/5 12/7	Experiments Examples	Ch. 13.1-13.5; Card and Krueger (1994) Ch. 13.6-13.7; <i>PS 10 due</i>
14	12/12 12/14	Exam 3 No class	
Final Exam Period			