

UC San Diego  
Winter 2008  
Class: T-Th 11-12:20 (Center 115)

Professor Eli Berman  
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OH: T 9:30-10:30 EC 218

### **Economics 120B Econometrics**

This course prepares students for practical empirical research in an academic or business setting. It introduces three major ideas in econometrics: quantifying uncertainty using confidence intervals, using regression to infer causal relationships, and using regression for prediction. We also cover exotic concepts such as heteroskedasticity and instrumental variables. Graduates will be able to conduct and read simple empirical research.

The prerequisite is one of EC 120A, Math 183, or ECE109. Students without a prerequisite are welcome to attend the first few classes but must get permission to register.

The material is fairly well covered in *Introduction to Econometrics (first or second edition)*, by Jim Stock and Mark Watson, which is *required* reading and is available at the bookstore. Another helpful text is *Introductory Econometrics*, by Arthur Goldberger.

We will learn to use an econometrics program called *Stata*. Students have access to *Stata* in the computer lab. Individual copies of *Small Stata* can be leased for about \$48 at <http://www.stata.com/order/new/edu/gradplans/gp-direct.html> . *Stata* is essential for problem sets.

Evaluation: There will be a midterm exam (worth about 35% of the grade) on Thursday February 7, a final (about 45%) on Thursday, March 20 at 11:30 AM, and three or four problem sets (worth about 20% together). No other exams are planned. Exams may be proctored using video. Reviewing class notes with knowledgeable friends, solving problem sets, reviewing old exams, and reading the text are good ways to prepare for exams.

Written work: The “Buckley” waiver makes it much easier to return your written work, by allowing us to put it in a public place rather than having you meet with the TA. Please read the attached waiver, sign it, and return it to a TA if you’re comfortable with it.

Disabilities will be accommodated. Please refer to OSD policy on what we do to help. <http://www-senate.ucsd.edu/manual/appendices/app3.htm> .

If you have any questions please feel welcome to come chat in office hours. Office hours tend to get congested the week before exams.

*In order to compensate for lost classes in 120A during the week of wildfires we may shift review classes in preparation for the midterm and final exam to the evening.*

## COURSE OUTLINE:

### 1. Introduction: Why Study Econometrics?

Who needs data anyway? If you had some, what would you do with it? Econometric models, parameter estimates, prediction and the testing of economic theories. Getting good data: Experimental vs. nonexperimental data. Cross-sections, Time-Series, Panels.

Reading: Stock & Watson - Chapter #1.

### 2. Probability and Statistics: A quick review

Probability, random variables, the normal distribution and the central limit theorem, inference, confidence intervals and hypothesis testing. Asymptotics of the sample mean. Using *Stata*.

Reading: Chapters #2 and #3.

### 3. Simple Regression (one regressor)

Fitting a line through a cloud of points. Least squares, unbiased estimates, consistent estimates, confidence intervals, hypothesis testing, omitted variable bias,  $R^2$ .

Reading: Chapters #4 and #5.

{Review and midterm about here}

### 4. Multiple Regression: Estimation

The second explanatory variable, interpreting coefficients, efficiency & heteroskedasticity, omitted variable bias.

Reading: Chapter #6.

### 5. Causal Inference and Random Assignment

Random assignment vs. omitted variable bias. Reading: Ch #13.

### 6. Multiple Regression: Inference

Confidence intervals (CI) for parameters, CI for predictions, hypothesis testing, single (t) vs. multiple (F) tests. Etiquette for reporting results.

Reading: Chapter #7.

### 7. Sources of Bias: measurement error, sample selection, simultaneity and omitted variables

Omitted Variable Bias again, Measurement Error, Fixed Effects, Sample Selection, Simultaneity.

Reading: Chapters #9 and #10.

### 8. Identification and Instrumental Variables

Causal inference again, instrumental variables vs. omitted variable bias, two-stage least squares, natural experiments.

Readings: Chapter #12;

Angrist, Joshua D. (1990) "Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records," *American Economic Review* 80(3) (June).

STUDENT CONSENT FOR RELEASE OF STUDENT INFORMATION  
(Buckley Waiver)

I hereby authorize the UCSD Economics Department to return my graded examinations and problem sets by placing them in a location accessible to all students in the course. I understand that the return of my examinations and problem sets as described above may result in disclosure of personally identifiable information, that is not public information as defined in UCSD PPM 160-2, and I hereby consent to the disclosure of such information.

Quarter W08 Course: Econometrics 120B Date:       

Instructor: Eli Berman

Student ID#                     

Print Name                                     

Signature