Syllabus: Economics 120B
Econometrics, Fall 2014
Prof. Eli Berman, UC San Diego

Description: This course prepares students for practical empirical research in an academic or business setting. It covers four major ideas in econometrics: quantifying uncertainty using confidence intervals, using regression to infer causal relationships, omitted variable bias, and using regression for prediction. We will also cover advanced concepts such as heteroskedasticity and fixed effects.

The material may be difficult and the workload substantial, particularly for people who find math courses challenging or have never used statistical software. Your payoff will be a set of skills and analytical tools that are extremely useful and in high demand in the marketplace.

Times: Tuesdays and Thursdays, 8: 00 – 9: 20 am, SOLIS 104
Tuesdays and Thursdays, 9: 30 – 10: 50 am, SOLIS 104
You may attend either class, regardless of which you are enrolled in, as long as the Fire Marshall's safety limit is not exceeded.

Contact me? elib@ucsd.edu
Office hours: Thursday 11am – 12: 20pm ECON 218

TAs:

Marina Kutyavina	mkutyavi@ucsd.edu
Xuan Liang	**x5liang@ucsd.edu**
Yanjun Liao	**yal005@ucsd.edu**
Ce Liu	**cel013@ucsd.edu**

Graders:

Daniela Vidart-Delgado	**dvidartd@ucsd.edu**
Wayne Sandholtz	**wasandho@ucsd.edu**

Office hours will be held MTW 5-7pm in Seq. 231.
The TAs are very clever, and well trained in econometrics. I encourage you to take advantage of their help during office hours. There are no office hours the first week of class.

Yida Wang will provide instruction in Stata (and Excel) in the computer lab (Seq. Hall 142) Wednesday 1-3pm and Friday 1-3pm.

Sections:

Thursdays	6: 00 – 6: 50 pm, 7: 00-7: 50	CENTR 105
Fridays	3: 00 – 3: 50 pm, 4: 00-4: 50	CENTR 105

You may attend either section, regardless of which class you are enrolled in. Sections aim to cover the same information, so you do not need to attend more than one. There will be no section the first week of class.

Class Web Site: ted.ucsd.edu
The class web site will contain this syllabus, lecture notes, homework assignments, occasional class announcements, and discussions. You should check it regularly.
The **fastest** way to get an answer online is to choose <Discussions> and <**Ask the TA**>, which the TAs and I monitor more frequently than email. You may post anonymously.

Prerequisite: Econ 120A or ECE 109 or Math 180A or Math 183 or Math 186 or instructor permission.

Clickers: i-Clickers should make the class more interesting. They are **optional**, but fun, and can improve your grade. (See "Grades," below.)

Text: Introduction to Econometrics, 2nd Edition, by Stock and Watson (REQUIRED)
Statistics with Stata: Updated for Version 10, 7th Edition, by Hamilton (OPTIONAL)

Software: Practical learning will require a software package called *Stata*. *Stata* is essential for problem sets, so you need to be able to access *Stata* in a lab, or purchase your own copy. Students have access to *Stata* in the Computer Lab.
Individual copies of *Intercooled Stata (i.e., Stata/IC 13)* can be leased for six months for about $70 from http: //www.stata.com/order/new/edu/gradplans/campus-gradplan/
Small Stata is too small for this class.

Stata Lab: Tutoring in Stata and other computer skills will be provided by superb undergraduate TAs who excelled at 120B. Times TBA.

Quizzes: Quizzes on the readings are compulsory and count towards your grade. They are part of a nefarious plot to encourage your classmates to read at least as much as you do. Quizzes will be administered on TED. **You are responsible** for checking TED for quiz questions and submitting quizzes by midnight the night before class.

Homework: Homework is an integral part of this course, --the best way to learn econometrics is to do it. I will periodically assign problem sets throughout the quarter. These assignments will be posted on the web, and it is your responsibility to check the class web page regularly.

Homework will be graded on a four-point scale. A score of 1 will be given to homework which is clearly incomplete, but has made a start towards answering some of the questions. A score of 2 will be given to homework which is largely complete, but does not answer every question in full. A score of 3 will be given to homework which is clearly well-done, and answers all of the assigned problems. Homework that is complete and at least 80% correct will earn a 4.

Students may work together on problem sets, although solutions must be written up and handed in separately (including any computer output). It is a good idea to attempt the problems on your own before meeting with a group, so that you fully understand (and can help out your friends). While you may collaborate with others, any homework you turn in must represent your own work.

Solution keys to the homework will be posted on the class web page. As these solutions will be comprehensive and the homework is mostly graded for completeness, homework will not be returned. If you want a copy of your homework, please make a copy before you turn it in.

Your answers will be due at the *beginning* of class, normally one but possibly up to two weeks after a problem set is assigned. Late problem sets will not be accepted for any reason; if you cannot attend class, you can either have a classmate turn in your homework for you, or you can turn it in to a TA in OH *before* class begins. Emailed homework will not be accepted.

You are allowed to miss one homework without penalty, as I will drop the lowest score before calculating the homework portion of your grade. The tradeoff for this benefit is that I will be strict about not accepting late homework.

Laptops, phones, tablets:

Put them in airplane mode and turn off Wifi when class begins. I really need your full attention while in class and can't possibly compete with Instagram. So, feel free to use your laptops and tablets to take notes, but without Internet or mobile. If these devices remain a distraction I reserve the right to ban them.

Tests: We will have one midterm exam and a final.
The midterm will be administered Thursday Nov. 13, 8: 00-9:20 **PM** in SOLIS 107. Note the PM.
The final for the 8: 00 am class: Tues. Dec. 16, 8 AM to 10: 50 AM. Location: check tritonlink
The final for the 9: 30 am class: Thurs. Dec. 18, 8 AM to 10: 50 AM. Location: check tritonlink.

You must take the final exam with the class you are enrolled in. There will be no make-up exams or alternative exam dates.
In the tragic case of illness, accident or misfortune precluding you taking the midterm –with documentation from a doctor, the police or an acting head of state–, the final weight will be 90%.

Grades: The following formula will determine your course grade:
10% x Homework Grade +
10% x Quiz Grade +
Max (35% x Midterm Exam + 45% x Final Exam, 20% x Midterm Exam + 60% Final Exam)
i.e., a weak midterm can be made up for by writing a strong final.

In addition, you may achieve up to an additional 5% in clicker bonus points, if you click an answer to most questions in each class. Clicker bonus points are not included in calculating the class letter grade "curve."

Grading Policy: If you think a mistake was made in grading your exam, you may ask for a regrade. You must write out your reason for a regrade and turn it and your exam in within 10 days of when the exam is first returned to the class. Include an email address on your written explanation so we can let you know the result. If you ask for regrading, your entire exam is subject to regrade. This may bring to light some unnoticed errors, and you may end up with a lower score. Note that unless your answer is fully correct, the assignment of partial credit is a matter of judgment, so we are unlikely to change your grade --so as to treat all class members equally.

Cheating: Cheating is not allowed. If you are caught cheating, helping someone else cheat, or plagiarizing on an exam or homework, you will be penalized. Having unauthorized notes on your person during the exam constitutes cheating, for example, as using a smartphone during an exam. One possible penalty is a failing grade in this class. I reserve the right to monitor exams by video.

Miscellaneous:

Disabilities will be accommodated. For details contact our excellent staff: Jennifer Beauchamps, Kelly Escobedo, Gaby Perdomo, and Sylvia Ramirez in the office of undergraduate student affairs in Sequoyah Hall 245. econugadvisor@ucsd.edu

For administrative matters regarding dropping or adding the course, waitlists and such, please contact the office of student affairs or use the online resources provided by the university at https: //students.ucsd.edu/ .

Sleep Study: You can volunteer to learn about the effect of sleep habits on your performance by participating in a sleep study. More details in class, on the first day. Participants will be recruited on the second day of classes, Tuesday Oct. 7.

Questions? Please feel welcome to contact us on the TED site, email a TA, email me at elib@ucsd.edu or come talk during office hours. We don't bite.

COURSE OUTLINE (subject to change

1. Introduction: Why Study Econometrics?
Demand for Coffee.
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.

4. Multiple Regression: Estimation
The second explanatory variable, interpreting coefficients, omitted variable bias.
Efficiency & heteroskedasticity.
Reading: Chapter #6.

Midterm, Thursday Nov. 13, **8 PM**

5. Causal Inference and Random Assignment
Random assignment vs. omitted variable bias.
Reading: Ch #13.

6. Multiple Regression: Inference and Nonlinearity
Confidence intervals (CI) for parameters, CI for predictions, hypothesis testing, single (t) vs. multiple (F) tests.
Etiquette in reporting results. modeling nonlinear functions. interaction terms between independent variables
Reading: Chapters #7 and #8.

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.