

Introduction to Econometrics - Economics 4818-001
Summer Term A 2007, MTWRF 12:45-2:20, Gugg 205

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Hours: W 3:00-5:00, F 10-11:30

Economics 4818 is an introduction to the practice of econometrics, which has a range of applications in economic research. I like to think of econometrics as methods for using data and statistics to provide evidence for economic theory. This course will feature a mixture of learning both basic econometric methods (think of this as a “tool kit”) and learning how to apply these methods to answer economic questions. The goal of this course is to provide you with enough understanding and experience to use econometric analysis in your career: in government, academic or commercial applications.

The text for this course will be: _____
_____, by Jeffrey Wooldridge. New copies are expensive, but there should be used copies available if you buy early. You may be able to find a copy online that is less expensive, but keep in mind you will need it by January 17th. The second edition is usable; its text is identical to the 3rd edition, but is missing some practice problems. The text is important, as most of the concepts I teach will come directly from it. Keeping up in the readings is essential.

This is because the course requires familiarity with probability and statistics. Appendices B and C of the text summarize the necessary concepts in probability and statistics. It will be useful to review these, and I will spend some time on them in class. If you have taken a statistics course in the applied math department, such as “Introduction to Mathematical Statistics” 4520 or “Statistical Methods” 4570, this will certainly substitute for the prerequisite. Of course, to understand probability and statistics you need a basic understanding of algebra and

<http://www.colorado.edu/academics/honorcode>. Cheating on the exams is strictly forbidden. You may help each other complete the econometrics project (see below), but the draft you turn in must be original; plagiarism of anyone, both inside or outside the class, is a violation not only of the University Honor Code but also of your academic integrity. In general, collaboration on the problem sets and computer exercises is permitted, although separate assignments must be received from each of you. All assignments must be submitted in class, in person, on the day they are due, unless you notify me in advance of a reason that you must be absent.

In accordance with the recommendations from Disability Services, I will make reasonable accommodations for students with disabilities. If you have a disability and anticipate requiring changes in

choose an economic relationship to study
find data that describe the related variables
estimate the direction and magnitude of the relationship, and
write a paper about the relationship based on your estimates.

Let me describe in each of these steps in detail:

This is entirely up to you. The relationship doesn't have to be novel, and you can even duplicate studies that have been published in economic journals. Plagiarism, whether it is of a professional publication or of another undergraduate student, is of course strictly prohibited. The difference between duplication and plagiarism is that while you may choose the same relationship for part (1) as another study, the other parts must be unique to your paper, so that you end up studying the same relationship in a different way. Examples of relationships to study include demand functions for a particular product, labor supply in a particular market, the pricing of environmental public goods, household outcomes in a developing country or even a relationship between macroeconomic variables (interest and inflation, GDP growth and unemployment, etc). Many examples will be given in class. Think broadly when picking your topic. In general, you will want to study a causal relationship: your dependent variable should be some economic behavior that people exhibit, and your independent variables should be any variables, economic or not, that may influence such economic behavior. The more sophisticated your chosen relationship, the more lenient I will be with grading.

One approach is to pick the relationship first and look for matching data. For very simple relationships this may work, but an alternate approach will be to find interesting data and formulate a relationship that it can describe. You will probably need to find your dependent variable first, and then think about possible explanatory variables to go with it and look those up separately. Here is a partial list of possible data sources:

- Wooldridge Data Sets: A diverse collection of simple data sets assembled by the textbook author.
- World Bank *World Development Indicators*: Available online through Norlin Library, this provides hundreds of country level variables.
- International Monetary Fund *International Financial Statistics*: Also available online through Norlin, this provides country level financial variables.
- www.bls.gov: Detailed monthly data on U.S. unemployment and inflation, as well as wages and salaries.
- www.census.gov: Detailed data about the U.S. population from the U.S. census. Also, the Economic Census collects data every five years about U.S. firms and industries.
- www.bea.gov: Macroeconomic variables such as U.S. GDP, gross state product and U.S. current account.
- Compustat database – Detailed data about U.S. and multinational companies. Available online through Wharton Research Data Services (WRDS), but only through terminals in the business library.

This is a partial list, and I encourage you to look for data on your own. Another

The other assignments include problem sets, computer exercises, in-class quizzes and a paper assessment. Problem sets of four to six questions will be chosen from the text. Problem sets may be handwritten, but should be legible. These assignments will be posted on the course website, as will answer keys after the due date. The due dates are shown on the schedule below. We will spend some time in class discussing the answers to each assignment, and students may volunteer to demonstrate the problems for extra credit. Periodically we will have in-class quizzes and some unannounced extra-credit as well, which will be a small portion of the problem sets grade. The paper assessment will consist of answering a series of questions about a journal article (assigned by me), as a way to become familiar with the type of research done with econometrics.

The computer exercises are assignments that will also be posted online, and will be done with a computer program. These must be typed, and may be done jointly with a partner. The recommended program is E-views, which is installed in the department computer lab. A student version of E-views may be purchased for about \$30.

6/4/07: Introduction (Ch. 1), Statistics Review (Appendices A and B)

6/5: Statistics Review, (Appendices B and C), Simple linear regression (2.1, 2.2)

6/6: **Computer Exercise 1 Due**, Functional Form, Properties of OLS (2.3, 2.4, 2.5)

6/7: Multiple Linear Regression (3.1, 3.2)

6/8: **Problem Set 1 Due**, Algebra and Assumptions of OLS (3.2, 3.3)

6/11:

6/12: Review Problem Set 1, Irrelevant variables and omitted variable bias, Unbiasedness and efficiency of OLS (3.3, 3.5)

6/13: **Computer Exercise 2 Due**, Variance of OLS estimators, Multicollinearity, Inference of a single parameter with OLS (4.1, 4.2)

6/14: **Paper Assessment 1 Due**, Two-sided tests and confidence intervals (4.2, 4.3), F-tests (4.5)

6/15: **Problem Set 2 Due**, Special Tests, Interpreting Regressions (4.4, 4.6), topics discussion, Consistency (5.1)

6/18: Review Problem Set 2, Asymptotic normality and effi

6/25: Serial Correlation (12.1), Testing for serial correlation (12.2), Correcting for serial correlation (12.3)

6/26: Differencing time series (12.5), Heteroskedasticity in cross-sectional models (8.1, 8.2), Testing for heteroskedasticity (8.3)

6/27: **Econometrics Project Due** Correcting estimates with heteroskedastic errors (8.4)

6/28: Endogeneity and functional form (9.1), Proxy variables (9.2)

6/29: **Problem Set 3 Due**, Measurement error (9.3)

7/2:

7/3: , Sampling Bias (9.4)

7/4: Happy Independence Day

7/5: **Problem Set 4 Due**, Review Problem Set 3, General Review,

7/6: (12:45 PM)