14.31 - Econometrics, Fall 2000

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Office hours are by appointment. Or you can try virtual office hours because we also answer questions by e-mail. Copies of this reading list and of problem sets will be on the class web page, http://web.mit.edu/14.31/www/. Check this page for announcements about time extensions, errata, etc.

1. **Course Description and Prerequisites**. This course will introduce econometric analysis of linear models, both theory and application. The only formal prerequisite is 14.30 or the equivalent, but familiarity with matrix algebra will be helpful.

2. **Texts**. The required texts are *Econometric Models and Economic Forecasts* by Pindyck and Rubinfeld and *The Practice of Econometrics, Classic and Contemporary* by Berndt. The latter will also be a good place to look for ideas for the empirical paper. You may also want to invest in your own set of STATA manuals for $135.00 (go to http://www.stata.com/bookstore/refset.html). There is an introduction on the class web page. There are also manuals in the Economics Department computer clusters.

3. **Requirements** The course grade will be based on two exams (30 percent each), 5 problem sets (20 percent), and an empirical paper (20 percent). There will be a review lecture before each exam. The problem sets will be both analytical and empirical. STATA (available on athena or on PCs in the department labs) will be the statistical package of choice. The data that you need will be both on the floppy provided in Berndt and in the athena course locker. One sheet of notes will be allowed for the exams. Bring a calculator. We will provide any necessary tables. You may collaborate on the problem sets, but must write up and hand in your own solutions. You should feel free to consult any sources, including your classmates, for help on your empirical paper, but each student will, of course, be required to hand in his or her own original paper. Futhermore, the deadline for the paper will be strictly enforced. You will lose 1/4 of a grade for each day you hand it in late. All assignments and exams are mandatory and must be handed in on time. Your answer must be clearly indicated. Regular attendance at the recitation is strongly recommended. The TA will discuss problem sets, clarify lecture material, and provide computer guidance.

4. **Important Dates**

   - Tuesday, October 10, Holiday (Columbus Day)

- Tuesday, October 24, Exam 1 in class

- Friday, November 10, Holiday (Veterans' Day)

- Wednesday, November 22, Drop Date

- Thursday, November 23, Holiday (Thanksgiving)

- Thursday, December 7, Exam 2 in class

- Tuesday, December 12, paper due by 11:30 am

5. **Course Outline** Chapters in parentheses are from Pindyck and Rubinfeld (PR) and Berndt (B)

   - Review of Probability and Statistical Inference (PR: ch 2): Random variables, expectation and variance, point and interval estimation, hypothesis testing

   - Simple Linear Regression (PR: ch 1, 3) (B: ch 2): Least squares estimation, statistical properties of estimates, goodness of fit

   - Multiple Regression (PR: ch 4, 5) (B: ch 3, 4, 5): Estimation of regression coefficients, tests of linear restrictions, dummy variables, prediction

   - Heteroskedasticity and Autocorrelation (PR: ch 6)(B: ch 6): Generalized least squares estimation

   - Specification Error (PR: ch 7, 12)(B: ch 8, 10): Omitted variables, measurement error, simultaneous equations

   - Advanced Topics (PR: ch 9.4, 11, 15-19)(B: ch 11): Panel data, discrete choice models, time series

TERM PAPER

Samples of past term papers are on reserve at Dewey library. The term paper should be on a topic of your own choice, but you should talk to your professor to verify that what you are planning to do is feasible. Try to avoid the minimum wage and Barro growth regressions – I've gotten too many of those in the past and my weariness shows up in the grading so there is an implicit penalty. The paper must be an empirical paper. You can collect your own data or you can use some of the common datasets. Just make sure you have enough disk space before downloading. Some data sites are

1. Harvard-MIT Data Center, http://data.fas.harvard.edu/hdc/homepage.shtml

2. National Bureau of Economic Research, http://www.nber.org/

3. Integrated Public Use Microdata Series (census microdata), http://www.ipums.umn.edu/

4. Aggregate data (e.g. average hours worked, the CPI) are also available from various government agencies. Check out Dewey library's web page http://www.libraries.mit.edu/dewey/data/index.html

The paper must be written as a technical paper. There should be subsections to it. For example, Introduction, Data, Empirical Framework, Results, Conclusion. The introduction should motivate the question. Do some research on the literature. Learn to use econlit. The data section should describe the data that you use and how you constructed your particular sample. What variables did you create? The empirical framework should describe how you approach the problem. Have an equation in the text that clearly indicates what regressions you are running. Are there any empirical issues that you will have to watch for? The results section should contain your regression results and results of any tests that you ran. The tables should be self-sufficient, i.e. the notes should explain what data you are using and what regressions you are running. It should be obvious what each variable is. Provide a table giving means and standard deviations of all variables. The number of observations should also be in each table or note to the table. Goodness of fit statistics should be in the tables as well. Don't expect the tables to convey everything – describe the results in words in the results section and interpret what the coefficients mean. The conclusion should summarize your results and discuss some of the broader implications (refer back to the introduction, what can you say about this policy issue or about the question in the economics literature?). The paper should be ten to 15 double-spaced pages. Do not exceed 20 pages.