Fundamentals of Statistics and Econometrics (E570)
Fall 2007 Syllabus

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Class meeting: T 6:00-8:40 pm
Nursing (NU) 205.
Office Hours: T 3:00-5:00 pm
and by appointment.

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Course goals:
1. Use basic econometric skills to answer an economic question.
2. Learn to program in STATA.
3. Acquire and prepare data for analysis.
4. Write a clear description of your econometric analysis.

Required texts:
Wooldridge, Jeffrey M. 2006. *Introductory Econometrics*, Third Edition, Cincinnati, OH: South-Western College Publishing. ISBN: 0324289782.

Stata/SE 10Availability:
1. Social Science Computing Classroom (SSCC) - 4 th floor Cavanaugh Hall (CA 436).
2. Economics graduate students room - 5 th floor Cavanaugh Hall (CA 534).
3. UITS-maintained Student Technology Labs - BS3000, BS3003, BS3005, IT131, SL070.

Optional, but useful, texts:
1. Baum, Christopher F. 2006. *An Introduction to Modern Econometrics Using Stata*. College Station, TX: Stata Press. ISBN-10: 1-59718-013-0/ISBN-13: 978-1-59718-013-9.

2. McCloskey, Dierdre. *Economical Writing*.

I suggest buying both Baum and McCloskey.

Also useful are:
3. Hamilton, Lawrence C. 2006. *Statistics with STATA (Updated for Version 9)*. Brooks-Cole. ISBN: 049510972X.

4. Kennedy, Peter. 2003. *A Guide to Econometrics*, (5th edition) Cambridge: MIT Press. ISBN: 0-262-61183-X.

5. Hill, Martha S. 1992. *The Panel Study of Income Dynamics: A User's Guide*. Newbury Park: Sage Publications. ISBN 0-8039-4230-3.

Other required reading: Currie, Janet and Aaron Yelowitz. 2000. "Are Public Housing Projects Good for Kids?" *Journal of Public Economics* 75(1): 99-124.

Course Requirements:

1. Do the home projects. They are a combination of statistical computing and mathematical derivations but mostly computing. You must do all the problems but I will randomly select one or two for grading. I'll provide answer sheets for you to carefully evaluate how you did on the other questions.

Work together, discuss the problems, and ask each other questions. You will learn a lot that way. But after you finish working together, go off by yourself and write down your own answer to the questions. Do not come up with a single answer in your work-group and then each student hand in that identical answer.

And never, never copy each other's work. Never copy someone's work (another student's work, or an article someone published and you found in the library) and hand it in as your own.

2. There is a final project that is due on the last day of class. The project will be to use data to estimate a model of behavior and then write a paper to clearly describe the results and to explain what you did and why. I will have you begin working on the project and writing small portions of your paper early in the semester. You will read each others' early drafts and provide criticisms and suggestions. You will modify your draft according to the criticisms and suggestions you receive. The final paper you turn in at the end of the semester should be around ten pages. If the final paper is submitted late, you will lose one-half of a letter grade for each day late.

3. Unless there is a serious emergency, I will never grade late homework or allow you to miss the midterm or the final.

4. Read the chapter(s) to be discussed BEFORE coming to class.

5. At the beginning of each class I will collect from you a written question about the reading you should have done for that night's class. I will use the question you write to judge the depth of your reading. The questions also will influence the content of my lecture.

You are welcome (and encouraged) to write more than one question, but one question is the minimum. If you write more than one, put the question you care about most as number 1.

6. Course grade breakdown:

15	percent - Before-class written questions
15	percent - Home projects.
20	percent - Midterm exam (October 9 — no make-ups).
20	percent - Final project (December 4).
30	percent - Final exam (December 11 — no make-ups).

A Word on the Texts

Wooldridge's text is a modern presentation of econometrics in the sense that it uses regressions as a teaching tool to help you understand problems in regression analysis, constantly calls you to think about unobservable influences on the variables you are studying, and, in many instances, discusses newer procedures. These procedures are not just "new"; they are more intuitive and easier to program. It is truly a wonderful book and through it you will learn to think like an econometrician.

Baum's book teaches you how to do in Stata the econometrics you have learned from Wooldridge. So read Wooldridge before coming to class, and read Baum after class.

Baum's book also has another advantage: sometimes he uses the same explanations of an econometric concept that I do. For instance, I think the easiest way to understand the intuition of the least squares estimator is to think of the estimator as a "method-of-moments" estimator. Baum also uses the method-of-moments explanation on pp. 72-73.

Read Baum Chapter 1 right away. Then read Chapters 2 and 3 as you go through the early part of the semester. When you read about a topic in Chapters 2 and 3, do not just read—try it out. Trial and error is how everyone (including me) learns to program.

Baum Chapters 4-8 line up with the chapters we will cover in Wooldridge in an obvious way. These Wooldridge and Baum chapters should be read in parallel. We will not cover the material in Baum Chapters 9 and 10, but your later econometrics courses will.

Hamilton's book also teaches you how to use STATA to perform basic statistical analyses. Hamilton's basic statistical analyses, not econometrics. Still, it is worh looking in Hamilton's book if you want to figure out how to do something in Stata, and Baum does not tell you what you need to know.

Baum's and Hamilton's books save you from having to buy an expensive set of documentation. However, the SSCC has a full set of documentation. Also, STATA's on-line help actually does (help). In Hamilton's book you should read Chapters 1-4, 6, and 7—especially chapters 6 and 7. Chapters 1 - 4 can be read as you have need.

Wooldridge's text teaches you how to do econometrics. Sometime, though, in the midst of learning the details you can lose sight of the big picture. Kennedy's book provides the big picture (but does not teach you how to do econometrics). When you are facing a specific econometric problem and wondering about how others think about this problem and what solutions have been proposed, Kennedy's book is a good place to check. We will not use it in the course, but you should know that it exists and buy it if you want to.

When learning a lot of details about econometrics, it is also easy to neglect to learn how to conduct an empirical project beginning to end and how to write-up the analysis. Wooldridge's Chapter 19 is a highly useful guide to doing a complete empirical project. You should refer to it as you plan and write your final project and as you read published empirical research (and your fellow students' papers!). The paper by Currie and Yelowitz is an excellent empirical paper---compare it to Wooldridge's Chapter 19—published in a top journal that uses econometric techniques that are no more sophisticated than the ones you will learn in this course.

Finally, for those wanting more econometrics: a very good text at the Ph.D. level is Greene, William. 2005. *Econometric Analysis* (5th edition). Upper Saddle River, NJ: Prentice Hall. Though we will not use this book, this is the next place you should look for a more

rigorous presentation. It also covers more topics than either of our texts. Wooldridge also has a Ph.D. level text: *Econometric Analysis of Cross Section and Panel Data*, which is very good, but omits time-series. Wooldridge's text is easier to learn from (Greene's text reads a little like an encyclopedia). I'd say if you are working with cross-section or panel data, try Wooldridge before Greene. You will learn a lot, however, by reading both.

Courses After E570

1. Next summer you will take Applied Microeconomics I (E581), a course in which you will learn maximum likelihood estimation and limited dependent variable models (these topics are introduced in Wool. 17), among other things. Next fall's Applied Econometrics and Forecasting (E574) provides further work on time-series models (see Wool. 18 for starters). In the spring following that you will take Applied Microeconomics II (E582) which includes further work on limited dependent variable models, sample selection, and panel data methods (see Wool. 13, 14, 17.4 and 17.5 for an introduction).

2. If you want to get a job using your statistical analysis skills, you must learn to use SAS. When it comes to econometrics, SAS is not as powerful, not as well-documented, and not as easy to use as STATA, but the majority of people doing statistical analysis (rather than econometrics) use SAS. So when these people look to hire someone new, they want that new person to know SAS.

The best way to learn SAS (as well as exploratory data analysis) is to take STAT 521 Statistical Computing as an elective.

Fall 2007 Schedule:

Week 1: Wool. 1.	What is econometric analysis?
	Review of statistics. Introduction to STATA.
	(Wool. Appendices B and C also review probability and statistics).
Wool. 2.	Simple Regression Model
Baum 1	Introduction
Ham. 1, pp. 56-61, 120-124, 130-133	Introduction, creating random data. Summary statistics. Frequency tables.
Week 2: Wool. 2.	Continued from previous week.
Baum 4.1, 4.2	"
Baum 2, 3.1, 3.9	As you have need. No need to read 3.2-3.8 now
Week 3: Wool. 3.	Multiple Regression Analysis: Estimation
Baum 4.1, 4.2	"
Ham. 6 (pp. 159-175).	Linear Regression.
Week 4: Wool. 3.	Continued from Week 3.
Baum 4.3, 4.4 5.2.1, 5.2.4, 5.2.5	
Week 5: Wool. 4.	Multiple Regression Analysis: Inference
Baum 4.4, 4.5	
Ham. 6 (pp. 175-176).	Hypothesis tests.
Wool. 5.	Consistency, asymptotic normality, asymptotic efficiency.
Week 6: Wool. 6.	Functional form problems. Goodness of fit.
Baum 5.1, 5.2.2	
Week 7: Midterm exam.	Covers Wooldridge through Week 5.
Week 8: Finish Wool. 6.	Confidence intervals for predictions. Log models.
Baum 4.6-4.7	
Go over midterm.	
Week 9: Wool. 7.	Multiple Regression with Qualitative Information.
Baum 7.1, 7.2	
Ham. 176-183.	Dummy variables.
Week 10: Wool. 8.	Errors that are heteroskedastic.
Baum Intro., 6.1.1, 6.2	
Ham. 256-258.	

Week 11:	Wool. 9.1, 9.4, 9.2. Baum 5.2.6-5.2.9 Ham. 7	Functional form specification, RESET. Missing data, outliers. Omitted variables-proxy variables.
Week 12:	Wool. 9.3. Wool. 15. Baum 5.3 and 8	Measurement Error. Instrumental variables estimation (omitted variables again).
Week 13:	Wool. 15.4. Wool. 16.1-16.4. Baum 8	Continued from previous week. Simultaneous equations.
Week 14:		Continued from previous week. Discussion of questions about individual projects.
Week 15:	Wool. 10, 11, 12; Wool. 18.2, 18.3, 18.5.	Time-series models. Errors that are autocorrelated. Forecasting.

"Wool." refers to the Wooldridge text. "Ham." refers to the Hamilton text.

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Plagiarism.
A student must not adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. A student must give credit to the originality of others and acknowledge an indebtedness whenever he or she does any of the following:

a. Quotes another person's actual words, either oral or written;

b. Paraphrases another person's words, either oral or written;

c. Uses another person's idea, opinion, or theory; or

d. Borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

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http://life.iupui.edu/help/docs/Part_3all.html

Cheating: Any instance of copying during the midterms and exams will result in a grade of F for the course and a report to the Dean of Students.