Economics 253: Empirical Methods in Economics
Fall 2007

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Office hours: Monday 10-11.30; Tuesday 1.30-3; and by appointment

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Course information on the web: http://www.williams.edu/go/blackboard

Course objectives:
This course provides an introduction to data analysis and econometrics - the use of statistics to analyze economic problems. The goals of the course are twofold: to enable you to understand and evaluate econometric studies done by others, and to allow you to perform econometric analyses of your own. Consequently, in addition to learning the theory of econometrics, you will apply the techniques you learn to analyze data using Stata, a powerful and widely used statistical software package. No prior experience with statistics is assumed or needed.

The course has three sections: 1) an introduction to probability and statistics; 2) the multiple regression model; and 3) advanced topics in the multiple regression model.

Probability is the study of the mathematical structure of events whose outcome cannot be known with certainty on the basis of initial information. Statistics uses probability to infer the characteristics of a population when the available data render certainty about those characteristics impossible. Econometrics is a sub-discipline of statistics that provides methods for inferring economic structure from data and testing economic theories. Econometrics provides the tools that make the practical application of economics possible. The importance of econometrics is not limited to economics, however–the tools you will learn are also widely used outside of economics, in fields ranging from public policy, public health, sociology and psychology to marketing and finance.

Note: For students graduating after 2008, this course will not satisfy the econometrics requirement for the major in Economics. Students in the Class of 2009 and succeeding classes need to complete Economics 255 or the equivalent. This course still satisfies the requirement for the major in Political Economy.

Textbooks and computer resources:

The (required) text is Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 3rd edition, Thomson Southwestern, 2006.

Stata is available in both PC and Mac versions, and should be installed on all lab computers. In addition, it is key-served software, so you can use it in your room on a computer connected to the network. It can be downloaded from http://cf.williams.edu/oit/software/index.cfm (choose Stata 9, not Stata/SE 9). If you have any difficulty installing Stata on your computer, the student help desk at x3088 should be able to help you.

Attendance and class participation:
It is extremely important to note that in econometrics, even more than in most economics courses, learning is cumulative. Each topic builds on the previous one. You must be regular in attending class and in submitting problem sets. By doing so, you will gradually develop data analysis skills. You are expected to attend class and to participate. Attendance will be recorded, and you will sometimes be asked to come up to the board and solve little exercises. Missing more than two classes will result in a reduction in your attendance grade based on the number of classes missed.

Academic honesty:
The Honor Code applies to all work submitted and exams taken in this class. You may collaborate on the problem sets, however as noted above, the work you turn in should be written up independently. You may also collaborate in studying or preparing for the exams, but the written exam should be your work alone.

Grading:
Grades will be based on attendance and participation, problem sets, two midterm exams, and a final exam. Your overall grade will be determined according to the following scheme:

Problem sets	10%
Attendance and participation	10%
Midterm 1	25%
Midterm 2	25%
Final exam	30%

Policies regarding problem sets:
There will be 8 problem sets. They are due in class according to the schedule of due dates to be announced on the first day of class. You may work with other students on problem sets, however you must write up your answers on your own, and in your own words. It is a violation of the Honor Code to copy another student's problem set. In addition, I recommend that you work by yourself as much as possible. Although the problem sets count for only 10% of your grade, thoroughly understanding them is crucial to understanding the material. In order for you to develop proficiency in data analysis, all problem sets will include empirical exercises to be done using the computer. **Late problem sets will not be accepted.** Instead, only the best 6 problem set grades will be counted in determining your final grade. *Thus, you can miss up to 2 problem sets for any reason without any penalty.*

Problem set schedule

Problem set #	Date distributed	Date due
1	Thu. 13 Sept	Thu. 20 Sept
2	Thu. 20 Sept	Thu. 27 Sept
3	Thu. 27 Sept	Thu. 4 Oct
4	Thu. 4 Oct	Thu. 18 Oct
5	Thu. 18 Oct	Thu. 1 Nov
6	Thu. 1 Nov	Thu. 8 Nov
7	Thu. 8 Nov	Thu. 15 Nov (Exam II day)
8	Thu. 29 Nov	Thu. 6 Dec

Course outline and reading list:
"W" indicates reading from Wooldridge text. Additional readings will be posted on the web or handed in class throughout the course. They will help you see a wide variety of concrete applications of econometric analysis.

1. Thu. 6 Sept. Introduction and overview

2. Mon. 10 Sept. Probability

3. Thu. 13 Sept. Random variables and probability distributions
W: pp. 728-737

4. Mon. 17 Sept. Features of probability distributions
W: pp. 737-753

5. Thu. 20 Sept. The normal distribution and the central limit theorem
W: pp. 753-760

6. Mon. 24 Sept. Statistical inference: point and interval estimation
W: pp. 763-777, 780-788

7. Thu. 27 Sept. Testing hypotheses I: general approaches
W: pp. 788-801

8. Mon. 1 Oct. Testing hypotheses II: applications

Thu. 4 Oct. Review session **(during usual class time)**

Mon. 8 Oct. No class – Reading Period

9. Thu. 11 Oct. Exam I (covers material through 1 Oct.)

10. Mon. 15 Oct. Introduction to linear regression: the two-variable model
W: ch. 1, 2.1-2.2

11. Thu. 18 Oct. The two-variable model, continued
W: ch. 2.3-2.5

12. Mon. 22 Oct. Stata Lab 1 **(Class meets in computer lab to be announced)**

13. Thu. 25 Oct. Statistical properties of ordinary least squares

14. Mon. 29 Oct. Multiple regression
W: ch. 3

15. Thu. 1 Nov. Hypothesis testing in regression
W: ch. 4

16. Mon. 5 Nov. Hypothesis testing and goodness of fit
W: ch. 6.3

17. Thu. 8 Nov. Regression specification: functional forms and dummy variables
W: ch. 6.2, 7.1-7.4

18. Mon. 12 Nov. Stata Lab 2 **(Class meets in computer lab to be announced)**

19. Thu. 15 Nov. Exam II (covers material through 8 Nov.)

20. Mon. 19 Nov. An application of dummy variables: simple panel data methods
W: ch.13.1-13.2

Thu. 22 Nov. No class–Thanksgiving Break

21. Mon. 26 Nov. Binary dependent variables
W: ch. 7.5

22. Thu. 29 Nov. Heteroskedasticity
W: ch.8.1-8.3

23. Mon. 3 Dec. Instrumental variables 1 (*if time permits*)
W: ch. 15.1 – 15.3

24. Thu. 6 Dec. Instrumental variables 2 (*if time permits*)
W: ch. 15.4 – 15.5

Final Exam (date to be announced)