

SIMON FRASER UNIVERSITY
Department of Economics

Econ 435 – QUANTITATIVE METHODS IN ECONOMICS
Syllabus – Fall 2001

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COURSE OBJECTIVES AND PREREQUISITES

This course is an introduction to applied econometrics. The goal is to develop the skills necessary to conduct empirical research in economics. Another important goal is to acquire the necessary background to read and critically evaluate published research in professional journals. At the end of this course you should be able to read and understand most of the empirical papers in journals like the *American Economic Review* and the *Journal of Political Economy*.

The only essential prerequisites are (at least) one course in statistics and (at least) one calculus course. Linear algebra is not required. Of course, since applications will focus primarily on testing economic theories and evaluating economic policies, some knowledge of economic theory is assumed throughout.

COURSE STRUCTURE

The course is divided into three main parts. The first part covers Least Squares Regression with cross-sectional data. This is a convenient starting point, since cross-sectional data (usually) require the least sophisticated statistical methods. The second part of the course focuses on time series regression. Time series data often violate the classical statistical assumptions, and therefore require special attention. Finally, the third part of the course covers a range of special topics, including panel data methods, instrumental variables, qualitative-dependent variable models, and maximum likelihood estimation.

COURSE EVALUATION

	<u>Weight in Grade</u>
Problem Sets	– 25%
Term Paper (due December 3)	– 25%
Midterm exam (Wednesday, October 24)	– 25%
Final exam (Saturday, December 8)	– 25%

Learning econometrics is like learning how to ride a bike. You can't do it by just reading a book. You actually have to get out there and try it (and occasionally fall down). Thus, an integral part of the course is a sequence of computer assignments. The data for the assignments are available on the class website. Students can use whatever statistical package they want, although I recommend *EViews*, since it is powerful, easy-to-use, and readily available on the SFU computing network. The problem sets are available as PDF files on the class website. Students are also required to write a short term paper (10 - 15 pages. It *must* be typed). You are free to choose the topic, but it must be empirical. It can either replicate or extend previously published research, or analyze a data set that you collect yourself. If you cannot decide on a topic by November then you should let me know and I will assign one.

COURSE MATERIALS

There is one required book for this course:

1. *Introductory Econometrics: A Modern Approach*, by Jeffrey M. Wooldridge (South-Western, 2000)

I also highly recommend:

2. *A Guide to Econometrics*, by Peter Kennedy, 4th edition (1998), MIT Press.

Kennedy's book provides an intuitive and conceptual approach to econometrics. As such, it provides a nice complement to the often rather technical material in Wooldridge's textbook. (However, be forewarned that at times Kennedy's book is more advanced than Wooldridge's).

Both books are available at the campus bookstore and on reserve at the library.

COURSE OUTLINE AND READINGS

I. REGRESSION ANALYSIS WITH CROSS-SECTIONAL DATA (14 lectures)

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| Sept. 5 | – | Introduction and Course Overview
Wooldridge, Chpt. 1 |
| Sept. 10 | – | Simple Two-Variable Regression/The Mechanics of OLS
Wooldridge, Chpt. 2 (pgs. 21-46) |
| Sept. 12 | – | Simple Two-Variable Regression/The Mean & Variance of OLS Estimators
Wooldridge, Chpt. 2 (pgs. 46-60)
Kennedy, Chpts. 1 and 2 |
| Sept. 17 | – | Multiple Regression/Mechanics and Interpretation
Wooldridge, Chpt. 3 (pgs. 66-82)
Kennedy, Chpt. 3 (pgs. 42-50)
Problem Set 1 due in class |
| Sept. 19 | – | Multiple Regression/The Gauss-Markov Theorem
Wooldridge, Chpt. 3 (pgs. 82-102) |
| Sept. 24 | – | Statistics Review/Sampling Distributions
Wooldridge, Appendix B (section B.5) and Appendix C (section C.1 and C.2)
Kennedy, Appendix A
Problem Set 2 due in class |
| Sept. 26 | – | Statistics Review/Hypothesis Testing
Wooldridge, Appendix C (sections C.4, C.5, and C.6) |

- Oct. 1 – **Statistical Inference/ t -Statistics and Confidence Intervals**
Wooldridge, Chpt. 4 (pgs. 113-136)
- Oct. 3 – **Statistical Inference/Testing Linear Restrictions**
Wooldridge, Chpt. 4 (pgs. 136-154)
Kennedy, Chpt. 4
Problem Set 3 due in class
- Oct. 8 – **No Class (Thanksgiving Holiday)**
- Oct. 10 – **OLS Asymptotics/Probability Limits and Consistency**
Wooldridge, Chpt. 5, Appendix C (section C.3)
Kennedy, Appendix C
- Oct. 15 – **Scaling, Functional Forms, and Prediction/Dummy Variables**
Wooldridge, Chpt. 6, Chpt. 7 (pgs. 211-224)
Kennedy, Chpt. 14 (pgs. 221-224, 228)
Problem Set 4 due in class
- Oct. 17 – **More on Dummy Variables/Chow Tests**
Wooldridge, Chpt. 7 (pgs. 224-241)
Kennedy, Chpt. 14 (pgs. 225-226, 229-230)
- Oct. 22 – **Heteroskedasticity/Weighted Least Squares**
Wooldridge, Chpt. 8
Kennedy, Chpt. 8 (pgs. 116-121, 127-129, 134)
Problem Set 5 due in class
- Oct. 24 – **Midterm Exam (Closed Book)**
- Oct. 29 – **Specification Analysis/Measurement Error, Proxy Variables, and Outliers**
Wooldridge, Chpt. 9
Kennedy, Chpt. 5, Chpt. 6 (pgs. 94-99, 101-107), Chpt. 19 (pgs. 299, 304-305)

II. REGRESSION ANALYSIS WITH TIME SERIES DATA (3 lectures)

- Oct. 31 – **OLS with Time Series Data/Strict Exogeneity**
Wooldridge, Chpt. 10 (pgs. 310-324)
Problem Set 6 due in class
- Nov. 5 – **Trends and Seasonality**
Wooldridge, Chpt. 10 (pgs. 324-342)

- Nov. 7 – **Serial Correlation and Dynamic Specification Analysis**
Wooldridge, Chpt. 12 (pgs. 376-394)
Kennedy, Chpt. 7 (pgs. 121-126, 129-131, 135-136)

III. SPECIAL TOPICS (6 lectures)

- Nov. 12 – **No Class (Remembrance Day Holiday)**
- Nov. 14 – **Panel Data/Pooling**
Wooldridge, Chpt. 13
Problem Set 7 due in class
- Nov. 19 – **Panel Data/Fixed and Random Effects**
Wooldridge, Chpt. 14 (pgs. 441-453)
Kennedy, Chpt. 14 (pgs. 226-228, 231-232)
- Nov. 21 – **Instrumental Variables/Endogenous Regressors**
Wooldridge, Chpt. 15 (pgs. 461-476)
Kennedy, Chpt. 9 (pgs. 139-140, 151-153)
- Nov. 26 – **Two-Stage Least Squares**
Wooldridge, Chpt. 15 (pgs. 476-491)
Problem Set 8 due in class
- Nov. 28 – **Qualitative Dependent Variables/Logit and Probit Models**
Wooldridge, Chpt. 17 (pgs. 529-540)
Kennedy, Chpt. 15 (pgs. 233-235, 237-240, 243-244)
- Dec. 3 – **Review (Term paper due in class)**
- Dec. 8 – **FINAL EXAM**