

Economics 8205/8206

Applied Econometrics

Course Schedule

Instructors

Patrick Bajari, 908 Heller Hall
Phone: 612-625-8369
Email: bajari@econ.umn.edu
Office Hours: T,Th 9 a.m.-10:30 a.m. and by appointment

Matt Osborne, 947 Heller Hall
Phone: 612-624-4551
Email: osborne@econ.umn.edu
Office Hours: Mon 2:30 – 4:00 pm, Wed 10:00 – 11:30 am and by appointment

Teaching Assistant

Burhan Biner, 1015 Heller Hall
Phone: 626-9248
Email: biner@econ.umn.edu
Office Hours: W,F 2:30-4:00 and by appointment

Course Times: 12:45-2:00 p.m. Tu, Th, F

Location: Blegen 425

Overview: Welcome to Economics 8205/8206! This is a course intended for advanced first year students and second year students in economics. The purpose of this course is to give students a solid foundation in econometric techniques. We will focus on techniques that are commonly used in applied microeconomics, although many of these techniques can be applied to other areas as well. In addition, we will discuss a substantive application of these techniques every week.

This course will help you to rigorously understand issues in connecting data, statistics and economic theory. This toolkit will be of practical use to any student who plans on confronting data in their thesis or wishes to read and precisely understand the econometrics typically used in empirical research.

Required Textbooks.

Paul Ruud, *An Introduction to Classical Econometric Theory*.
A. Colin Cameron and Pravin K. Trivedi, *Microeconometrics: Methods and Applications*.

Requirements.

This class will be rather demanding. However, we hope to provide you with a valuable set of skills so that the benefits will exceed the costs.

1. The first, and most important requirement, is that you spend time reading the material before attending class. Part of this reading material is the textbook readings and applied papers; lecture notes for each class will also be posted on Pat's website before the lecture. The material we intend to cover will be challenging. You will internalize the concepts and models much more clearly if you spend time struggling with the material before class begins.
2. There will be regular (weekly or bi-weekly) problem sets. These problem sets will include problems from the text and exercises with data. You are encouraged to familiarize yourself with a standard statistics package such as STATA in order to complete the applied exercises. Students are encouraged to work together on the problem sets. However, each student should turn in their own answers to the problems.
3. In addition to the problem sets, a midterm and final exam will be administered. The final exam will be in class and will be closed book. The midterm exam will most likely be a take home exam.

Course Schedule.

Given the amount of material that must be covered, the Friday sections will be taught by Bajari and Osborne. The teaching assistant will grade the homework, hold regular office hours and be available to answer questions.

The first part of the course will cover the classic theory of linear regression and much of the material is an application of linear algebra and basic statistics. We will cover this material at the rate of approximately 3 chapters in Ruud per week (or one chapter per class).

Starting with the theory of GMM, we will cover the material at a somewhat slower pace and cover roughly two chapters per week. During the first part of the course, the material from Cameron and Trivedi will be used to supplement Ruud. At the end of the course, we will cover selected chapters from Cameron and Trivedi.

We will post course lecture notes and other material on Pat Bajari's web page. You may find it helpful to download and print out the lecture notes before class begins.

<http://www.econ.umn.edu/~bajari/teaching.html>

We will use statistical programs in some of the homework. You are free to use any package you desire. One user friendly and well documented package that you can use is STATA. The standard servers only have an 8 user license, which might be difficult to accommodate all users during peak times (e.g. right before homework is due). The lab in Blegen 440 has a 25-seat license for STATA that they just purchased, and it is open to graduate students both for instruction, and for general use. I've talked to the manager of those facilities, Pete Oberg, and he says that other than a few scheduled classes during the day, the lab is available for students to work on assignments.

Below is a tentative schedule for the course. This schedule is preliminary and subject to change.

Sept 5, Sept 7, Sept 8 (Osborne)

- Intro, Chap 1 Ruud, The Least-Squares Fit
- Chap 2 Ruud, The Geometry of Least Squares
- Chap 3 Ruud, Partitioned Fit
- Application: "Reputation in auctions: Theory, and evidence from eBay," Dan Houser and John Wooders. *Journal of Economics and Management Strategy*, 15(2), 353-370. (This and many other papers can be downloaded from the University of Minnesota libraries digital collection).

Sept 12, Sept 14, Sept 15 (Osborne)

- Chap 4 Ruud, Restricted Least Squares
- Chap 6, Ruud, Linear Unbiased Estimation
Chap 2, Cameron and Trivedi, Causal and Noncausal Models
- Chap 7, Ruud, Variances and Covariances
Chapter 3, Cameron and Trivedi, Microeconomic Data Structures
- Application: "Forward and Spot Exchange Rates," Eugene Fama. *Journal of Monetary Economics*, 14, 319-338.

Sept 19, Sept 21, Sept 22 (Osborne)

- Chap 8, Ruud, Variances and Covariances of OLS
Chap 4, Cameron and Trivedi, Linear Models
- Chap 9, Ruud, Efficient Estimation
- Chap 10, Ruud, Normal Distribution Theory
- Application: "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania," David Card and Alan Kreuger. *The American Economic Review*, 84(4), 772-793.

Sept 26, Sept 28, Sept 29 (Bajari, Sept 26, Sept 28), (Osborne Sept 29)

- Chap 11, Ruud, Hypothesis Testing
- Chapter 13, Ruud, Nonnormal Distribution Theory
- Chapter 14, Ruud, Maximum Likelihood Estimation

- Chapter 5, Cameron and Trivedi, MLE and NLLS Estimation
- Application

Oct 3, Oct 5, Oct 6 (Bajari)

- Chapter 15, Ruud, Maximum Likelihood Asymptotic Theory
- Chapter 16, Ruud, MLE Computation
- Chapter 17, Ruud, MLE Statistical Inference
- Application

Oct 10, Oct 12, Oct 13 (Bajari)

- Chapter 18, Ruud, Heteroskedasticity
- Chapter 19, Ruud, Serial Correlation
- Chapter 20, Ruud, IV Estimation
- Application

Oct 17, Oct 19, Oct 20 (Bajari)

- Chapter 21, Ruud, GMM
Chapter 6, Cameron and Trivedi, GMM
- Chapter 22, Ruud, GMM Hypothesis Tests
Chapter 7, Cameron and Trivedi, Hypothesis Tests
Chapter 8, Cameron and Trivedi, Specification Tests and Model Selection
- Application

Oct 24, Oct 26, Oct 27 (Bajari Oct 24, Osborne Oct 26, Oct 27)

- Chapter 22, Ruud, GMM Hypothesis Tests
Chapter 7, Cameron and Trivedi, Hypothesis Tests
Chapter 8, Cameron and Trivedi, Specification Tests and Model Selection
- Chapter 24, Ruud, Panel Data Models
Chapter 21, Cameron and Trivedi, Linear Panel Models
- Application
- Take Home Midterm

Oct 31, Nov 2, Nov 3 (Bajari)

- Chapter 25 Ruud, Time Series Models
- Chapter 26, Ruud, Simultaneous Equations
- Application

Nov 7, Nov 9, Nov 10 (Bajari)

- Chapter 27, Ruud, Discrete Dependent Variables
Chapter 15, Cameron and Trivedi, Multinomial Models
- Chapter 28, Ruud, Censored and Truncated Variables
- Application

Nov 14, Nov 16, Nov 17 (Bajari)

- Chapter 9, Cameron and Trivedi, Semiparametric Methods
- Chapter 11, Cameron and Trivedi, Simulation Based Methods
- Application

Nov 21 (Bajari)

- Chapter 13, Cameron and Trivedi, Bayesian Methods

Nov 23-Thanksgiving Holiday

Nov 24-Thanksgiving Holiday

Nov 28, Nov 30, Dec 1 (Bajari)

- Chapter 17, Cameron and Trivedi, Survival Analysis
- Chapter 18, Mixture Models and Unobserved Heterogeneity
- Application

Dec 5, Dec 7, Dec 8 (Bajari)

- Chapter 22, Cameron and Trivedi, Linear Panel Models, Extensions
- Chapter 23, Cameron and Trivedi, Nonlinear Panel Models
- Application

Dec 12 (Bajari)

- Chapter 25, Cameron and Trivedi, Treatment Evaluation
- Application

Final Exam (In Class)