

# ECON 303301, Section 1: Econometrics

Fall 2012

*Department of Economics  
University of Notre Dame*

Time: Monday/Wednesday 8:00am – 9:15am  
Classroom: 208 DeBartolo

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**Class web page:** <http://www.nd.edu/~wevans1/econ30331.htm>

## **Textbook:**

Jeffrey Wooldridge, *Introductory Econometrics: A Modern Approach*, 4<sup>th</sup> Edition, South-Western, Cengage Learning. ISBN10: 0324581629 ISBN13: 9780324581621

Along with this book, I will assign mandatory readings of academic articles. The readings are available for download in PDF format from the class web page. To comply with copy write laws, the web page is password protected and your NetId/password will provide you access to the articles.

**Office Hours:** Monday 1:30-3:00 and Tuesdays 3pm – 5pm; and by appointment.

I am never far from email. If you have a question, please feel free to contact me at wevans1@nd.edu.

## **Course rationale, objective and theme:**

What separates economics from most other social sciences is that our discipline begins with a few basic assumptions and utilizes these as building blocks for models of behavior. Models are only useful if they can be tested and economists have developed a large toolkit of statistical models that are used to test these theories. The workhorse statistical model in the social sciences is the ordinary least squares (OLS) regression. The bulk of the course will be spent outlining the theory behind and the properties of the OLS model. The course will however not just be an abstract exercise. For each topic, I will first present a standard textbook treatment of the topic. Next, we will read some academic papers that used the techniques outlined in class. Students will be expected to read the assigned papers and be able to discuss not only the econometric techniques used but also the economic issues as well. Finally, I will provide sample code that illustrates how one would obtain estimates given appropriate data.

The class will use the STATA statistical software package. STATA is a fast and versatile program that was written by economists so it is more intuitive for people in our field. STATA is also the program of choice for applied micro economists. Knowledge of STATA will greatly enhance your ability to get a job after graduation.

STATA is available in all Windows-based machines in computer clusters and classrooms on campus. STATA is not available on the MAC machines in the clusters. If you want your own copy of STATA, a one-year site license for STATA 10/IC can be purchased through the STATA Grad Purchase plan. The web site is <http://www.stata.com/order/new/edu/gradplans/gp->

[campus.html](#) and the cost is \$95. This version of STATA is available for either Windows or MAC platforms. This is not required for class but if you want to use STATA on your own laptop/desktop, this is the only avenue available.

To help you get started with STATA, I have put together a 15-page tutorial that is available on the class web page. You are expected to go through the tutorial yourself and become familiar with the basics of STATA. You need to do this soon because we will begin to use STATA early on in the semester. I will run a 75 minute 'get to know' STATA session for anyone interested. The class is not required and if you 'pick up' programming quickly, you may want to skip it. The STATA review session is scheduled for Friday, August 24<sup>th</sup>, 8:00am – 9:15am in the regular classroom.

**Prerequisites:** ECON 30330 or a serious course in Mathematical Statistics. You are also expected to know some simple calculus.

I have put together a 20 page review of ECON 30330 and this is available on the class web page. This handout goes over most of the important concepts that will be used this semester such as expected values, covariance, correlation, linear combinations of random variables, test of hypothesis, testing the equality of means from two samples, etc. Please read over the handout. If the terms in that handout are foreign to you, you may need to review your ECON 30330 notes.

**Expectations:** Students are expected to attend class, bring their name card, be prepared for class, to NOT be late to class, to participate in classroom discussions, to hand in assignments when due, and to NOT engage in academic dishonesty.

**Evaluations:** Grades for the course will be based on 7 problem sets (20 percent of the course grade), a mid term examination (25 percent), an empirical project (20 percent) and a comprehensive final exam (35 percent).

**Problem sets:** Seven problem sets will be assigned during the semester. These problem sets are designed to gauge your understanding of the concepts discussed in class. The problem sets will have two types of questions. The first are 'pencil to paper' where you are asked to prove a mathematical statement, calculate an estimate, derive an equation, etc. These questions are the type that will be asked on the exams. For the second type of question, you will given a data set and asked to generate and interpret statistical output. You can use any statistical software package to answer these questions but I will provide sample programs and support (i.e., I will answer questions) for STATA.

You are encouraged to work in groups on the problem sets but everyone must turn in their own copy of the answers. Problem set answers should be turned in at the beginning of class on the day they are due. I will not accept late problem sets.

The first problem set is simple – I want you to flip a coin 200 times, record the longest string of heads or tails in a row and email me that one number by Tuesday at noon, August 21<sup>st</sup>. I realize this is due the day before the 1<sup>st</sup> day of class but this is 10 minutes of work and you get 2.8% of the course grade for it so consider it a gift. The second problem set is on the class web page and is due at the start of class on Wednesday, August 29<sup>th</sup>, and will cover the statistics you should have learned in ECON 30330.

**Examinations:** The mid-term examination will be held Wednesday, October 10<sup>th</sup>, which is the Wednesday before Fall break. The final exam will be held in the regular classroom on Wednesday, December 12<sup>th</sup>, from 8:00am-10:00pm.

Exams will be a mix of problems like those from the problem sets, and discussion-type questions.

Makeup exams will only be given for students who have a valid University excuse, applied for in writing and adequately documented. I must receive documentation within 48 hours of the missed exam. Please familiarize yourself with student responsibilities concerning missed exams, missed assignments, etc.

**No excuse weight transfer between midterm and final:** Everyone has bad days – people get sick, they break up with their boyfriend or girlfriend, they get turned down for a job, etc. These exogenous shocks will for some adversely impact test performance. In most classes, since there are few exams, problems occur when bad days happen on test day. Once midterm grades are returned, if you had a “bad day” you can sign a contract with me that that reduces the weight of your first exam by up to 10 percentage points (reduces it to a minimum of 15% of the course grade) and increases the weight of the final by up to 10 percentage points (increases it to a maximum of 45% of the course grade). The contract cannot be rescinded once you take the final. You cannot bargain for more points to be transferred. You cannot transfer point ex post from the final to the midterm.

**Paper:** A group research project is due Wednesday, December 2<sup>nd</sup>, which is the last day of classes for the Spring semester. More information about the project will be given later in the semester but in a nutshell, I will provide you with a data set and a fairly narrow research question and you will be expected to review the relevant literature, estimate models to answer the particular question, and write up the results as if this were an academic paper. The assignment will be distributed on the first class after Spring Break. You will work in groups of three and you must identify your group by Friday, October 26<sup>th</sup>. If you cannot find a group, I will assign you one. It is assumed that if your name is on the paper, you made significant contribution to the project. Grades on the paper will be based on the quality of the writing (grammar counts), the justification for the model you estimate, and the accuracy with which you interpret your statistical models.

Please familiarize yourself with the Undergraduate Academic Code of Honor:  
<http://www.nd.edu/~hnr/code/docs/handbook.htm>.

### **Brief Outline, ECON 30331 Fall 2012**

- I. Moving from correlation to causation**  
Chapter 1, Wooldridge
- II. The bivariate regression model**  
Chapter 2, Wooldridge
- III. Multiple regression analysis: estimation**  
Chapter 3, Wooldridge

**IV. Multiple regression analysis: inference**

Chapter 4, Wooldridge

**V. Dummy variables**

Chapter 7, Wooldridge

**VI. Applications – Some papers**

Bertrand, Marianne and Sendhil Mullainathan, “Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination,” *American Economic Review*, 94(4), 2004, 991-1013.

Katz, Lawrence, Jeffrey Kling, and Jeffrey Liebman, “Moving to Opportunity in Boston: Early Results of a Randomized Mobility Experiment,” *Quarterly Journal of Economics*, 2001, 116(2), 607-654.

Duggan, M., and Steven Levitt, “Winning Isn’t Everything: Corruption in Sumo Wrestling,” *American Economic Review*, 92(5), 2002, 1594-1605.

Sacerdote, Bruce, “How Large Are the Effects from Changes in Family Environment? A Study of Korean American Adoptees,” *Quarterly Journal of Economics*, 121(1), 2007, 119-157.

**VII. OLS Asymptotics**

Chapter 5, Wooldridge

**VIII. Time series data**

Chapters 10 - 12, Wooldridge

I am not thrilled with the time series chapters in this book. I think they are overly complicated and as a result, they in some spots, unreadable. We will focus on the following sections

10.1 The Nature of Time Series Data

10.4 Functional Form and Dummy Variables

10.5 Trends and Seasonality

11.1 Stationary and Weakly Dependent Series

11.3 Using Highly Persistent Time Series in Regression Analysis

12.1 Properties of OLS with Serially Correlated Errors

12.2 Testing for Series Correlation

12.3 Correcting for Serial Correlation

David Wilcox, “Social Security Benefits, Consumption Expenditures, and the Life Cycle Hypothesis,” *Journal of Political Economy*, 97, April 1989, 288-304

Richard Thaler, “Anomalies: Weekend, Holiday, Turn of the Month, and Intraday Effects,” *Journal of Economic Perspectives*, 1, Fall 1987, 169-78.

Malkiel, Burton G. "The Efficient Market Hypothesis and Its Critics," *Journal of Economic Perspectives*, 2003, 17(1), 59-82.

## **IX. Panel Data Models**

Chapters 13 and 14, Wooldridge

Meyer, Bruce D., W. Kip Viscusi and David L. Durbin (1995), "Worker's Compensation and Injury Duration: Evidence from a Natural Experiment," *American Economic Review*, 85(3):322-340.

Card, D., and A.B. Krueger, "Minimum Wages and Employment: A Case Study of the Fast Food Industry in New Jersey and Pennsylvania," *American Economic Review*, September 1994, 722-794.

Linden, Leigh L. and Jonah Rockoff. "Estimates of the Impact of Crime Risk on Property Values from Megan's Laws." *American Economic Review* 2008, 98(3): 1103-27.

Ayres, Ian and Steven Levitt, "Measuring Positive Externalities from Unobserved Victim Precaution: An Empirical Analysis of Lojak," *Quarterly Journal of Economics*, 115(3), 2000, 755-789.

## **X. Instrumental variables**

Chapter 15, Wooldridge

Angrist, J.D., "Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records," *American Economic Review*, 80, 1990, 313-336.

Hotz, Joseph, Susan Williams McElroy and Seth Sanders, "Teenage Childbearing and Its Lifecycle Consequences: Exploiting a Natural Experiment." *Journal of Human Resources*, 2005, 40(3): 683-715.

Angrist, J.D., and W.N. Evans, "Children and Their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size," *American Economic Review*, 88(3), 1998, 450-477.

## **XI. Regression discontinuity models**

Matsudaria, Jordan, "Mandatory Summer School and Student Achievement: A Regression Discontinuity Approach." *Journal of Econometrics*, 2008, 142(2): 829-850.

Elder, Todd and Darren Lubotsky, "Kindergarten Entrance Age and Children's Achievement: Impacts of State Policies, Family Background, and Peers," *Journal of Human Resources*, 2009, 44(3): 641-683.

Card, David, Carlos Dobkin and Nicole Maestas, "Does Medicare Save Lives?" *Quarterly Journal of Economics*, 2009, 124(2), 597-636.