

**ECON 30331-02**  
**Econometrics**  
*Department of Economics*  
*University of Notre Dame*

Spring 2016  
MW 2:00pm - 3:15pm  
Classroom: 126 DeBartolo

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**Class web page:**

<http://www.nd.edu/~wevans1/econ30331.htm>

**Textbooks:**

Jeffrey Wooldridge, *Introductory Econometrics: A Modern Approach*, 5<sup>th</sup> Edition, South-Western, Cengage Learning. ISBN-13: 978-1111531041

Joshua Angrist and Jorn-Steffen Pischke, *Mastering Metrics: The Path from Cause to Effect*. Princeton University Press, 2014. ISBN-13: 978-0691152844

Along with these books, 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.

The Angrist/Pischke book follows the readings. For many of the major sections in the course, we will read an academic article that illustrates the techniques used in class. The Angrist/Pischke book will explain some of the readings.

**Office Hours:**

Monday 12:00pm – 1:30pm, Tuesdays 2:00pm-3:30pm, and by appointment.

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

I do a lot of traveling and have a lot of meetings as part of my job as department chair and my work with LEO. Some weeks we have to move office hours to other times. I will give you enough advanced warning so you can plan accordingly.

**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 theoretical 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.

## Statistical software

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 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 13/IC can be purchased through the STATA Grad Purchase plan. The web site is <http://www.stata.com/order/new/edu/gradplans/student-pricing/> and the cost is \$125 for a one-year license or \$75 for a six-month license. This version of STATA is available for either Windows or MAC platforms. This is not required for class but if you want a copy of STATA on your own laptop/desktop, this is your only option.

To help you get started with STATA, I have put together a 20-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, January 15<sup>th</sup> during regular class hours in the regular class.

I have programmed in STATA for years so if you have any question, please let me know. One note – in order to help you with your programming, I need to see the code. Therefore, copy the code you are working and email me the text. Too many people come to my office and say "I typed what was in the handout and it did not work" then don't show me their code. I need to see what you are doing before I can help.

**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 problem sets (25 percent of the course grade), a mid term examination (25 percent), an empirical project (20 percent) and a comprehensive final exam (30 percent).

**Problem sets:** Eight 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 is on the class web page now and is due next Wednesday, January 20<sup>th</sup>. This problem set covers the statistical concepts you should have learned in ECON 30330. This will take you a long time to complete so get started early.

**Examinations:** The mid-term examination will be held Wednesday, March 2<sup>nd</sup>, which is the Wednesday before Spring break. The final exam will be held in the regular classroom on Wednesday May 4<sup>th</sup> from 4:15pm – 6:16pm.

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 40% 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 points ex post from the final to the midterm.

**Paper:** A group research project is due at the start of class, Monday April 26<sup>th</sup>. More information about the project will be given later in the semester but in a nutshell, I will provide you will 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 Monday, March 14<sup>th</sup>. You will work in groups of three and you must identify your group by Monday, March 21<sup>st</sup>. If you cannot find a group, I will assign you one. It is assumed that if your name is one 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 Spring 2016

- 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 – OLS regressions**

Finkelstein, Amy, et al., 2012. “The Oregon Health Insurance Experiment: Evidence from the First Year.” *Quarterly Journal of Economics* 127(3), 1057-1106. [Skip Section IV.C on the Local Average Treatment Effect and all estimates based on LATE –we will get that later in the year. Read through page 1086 – we will mainly focus on the impact of winning the lottery on health care use]. Please read Chapter 1 of Angrist and Pischke to go along with this article].

Black, Sandra E. “Do Better Schools Matter? Parental Valuation of Elementary Education.” *Quarterly Journal of Economics* 1999, 114(2), 577-599.

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

Dale, Stacey Bery, and Alan B. Krueger. “Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables.” *Quarterly Journal of Economics* 117(4), 2002, 1491-27. Also, please read Chapter 2 of Angrist and Pischke.

**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

Chapter 5, Angrist and Pischke

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.

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

Chapter 3, Angrist and Pischke

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

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**

Chapter 4, Angrist and Pischke

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, Nicole Maestas, "Does Medicare Save Lives?" *Quarterly Journal of Economics*, 124(2), May 2009, 597-636.

Carpenter, Christopher, and Carlos Dobkin. "The Effect of Alcohol Consumption on Mortality: Regression Discontinuity Evidence from the Minimum Drinking Age." *American Economic Journal: Applied Economics* 2009, 1(1), 164-182.