

**University of Colorado at Boulder**  
**Department of Economics**

Prof. Brian Cadena  
[brian.cadena@colorado.edu](mailto:brian.cadena@colorado.edu)  
(303) 492-7908  
Website: CULearn  
<https://culearn.colorado.edu>

ECON 8848: Applied Microeconometrics, Spring 2011  
Syllabus and Schedule  
Office Hours: MW 12:30-1:30 PM, 3:00-4:00 PM  
Economics 14A  
Other times by appointment

**Course Description:**

Students who are successful in this course will be well-prepared to conduct empirical research across a broad range of fields, although the tools are used most frequently in the applied microeconomics fields. The course provides a “user’s guide” to many of the most commonly used econometric techniques, with a heavy focus on implementation and interpretation. We will begin the course with a STATA boot camp, quickly becoming familiar with the software package including programming techniques and data management skills. We will then move through a range of econometric topics, making sure to practice each technique in STATA. I hope to live up to the following quotation by Edward Leamer in his article *Let’s Take the Con out of Econometrics* (AER, 1983):

*“Methodology, like sex, is better demonstrated than discussed, though often better anticipated than experienced.”*

**Prerequisites:**

To enroll in this course, you must have a working knowledge of statistics and econometrics equivalent to that obtained in ECON 7818 and ECON 7828.

**Course Materials:**

There is no required textbook for this course, although I will provide references to a number of books and articles for the interested student. We will also read and discuss several articles. Some of these articles will be “theory” articles, discussing the relative merits of estimators or developing and applying new ones. Others will be “application” papers, usually papers that use a technique we have discussed in an honest and useful way. I will also provide lecture notes, and you will find these and the assigned articles posted or linked on the CULearn website. You should read the articles assigned prior to coming to class and be prepared to answer questions and participate in discussions. Please bring a copy of the papers we are discussing with you to class.

Students are not required to purchase their own copies of STATA, although those desiring to do so qualify for a substantial discount through the University’s GradPlan. More information is available through a link posted on the CULearn website. I recommend Stata/IC. The price is \$179 for a perpetual license (i.e. never expires).

Note: SMAEntial discount

more advanced copy (SE or MP), but the Intercooled version will allow you to complete all the requirements of this course.

I will use STATA during some lectures to demonstrate estimators and methods that we cover. If you have STATA installed on a laptop, you may find it useful to bring on those days.

### **Requirements and Grading:**



## Tentative Schedule

Topic	Tentative Dates
Introduction and STATA Basics	1/10, 1/12
MLK Day NO CLASS	1/17
Advanced STATA	
Descriptive Statistics, Figures and Tables	1/19
Data Management	1/24
Programming – Loops, Macros	1/26
Simulation	1/31
Linear Regression Review	
Functional Forms – Logs, Polynomials, Categorical Variables, Interaction Models	2/2, 2/7
Review of FWL and the meaning of “controlling for”	2/9
The Experimental Ideal	
Treatment Effects – Potential Outcomes Framework	2/14
Causality in an OLS Regression – the CIA	2/16
Propensity Score Matching	2/21, 2/23
Advanced Data Management	2/28
Panel Data Models	
Difference-in-Differences	3/2, 3/7 – paper
RE, FE, FD	3/9, 3/14 – paper(s)
MIDTERM EXAM	3/16
Variance Estimation in Panel Models	3/28, 3/30, 4/4 - papers
Instrumental Variables	
Basics – Constant Treatment Effects	4/6, 4/11 - paper
Local Average Treatment Effects	4/13
Regression Discontinuity	4/18, 4/20 – papers
Binary Dependent Variables	4/25
Review	4/27
FINAL EXAM	5/4 4:30-7:00 PM

**Other University Policies:**

## Reading List

The list below provides a guide to how to get the most out of your available resources for this course. Your most directly relevant text will be our lecture notes. They will provide you with the basics of all of the material that we cover in each class meeting. There are also two books that I think fit nicely with the applied nature of this course and offer a good complement to our in-class discussion. They are both relatively inexpensive, and I would recommend them as your best additional resources for learning the topics we cover. I also strongly recommend having one or more graduate econometrics textbooks for reference. Finally, we will read a few papers that actually apply the methods we are discussing. These are listed below in bold. Additional references that we will probably not have time for are listed in standard font. The links are active, but you will need to be on-campus or connected through VPN.

**Books with an Applied Focus.** I highly recommend getting a copy of each of these books, as they will provide a very useful supplement to my lectures and notes. Angrist and Pischke is relatively inexpensive (~\$25), and I would strongly suggest that each of you get a copy. The Cameron and Trivedi book is great, and it is specifically tailored for people learning STATA. A good strategy might be to order one for each study group (~\$50). As of this writing, they are currently listed together on Amazon as “Frequently Bought Together”

Angrist and Pischke (2009). *Mostly Harmless Econometrics: An Empiricist’s Companion*. **AP**

Cameron and Trivedi (2009). *Microeconometrics Using STATA*. **CT-STATA**

**Econometrics Reference Books.** I am not going to require you to have any particular one of these. I would recommend that you find at least one of the following books that you find useful as a reference book. I have tried to include the relevant sections where possible in the main table below.

Cameron and Trivedi (2005). *Microeconometrics: Methods and Applications*. **CT**

Davidson and MacKinnon (2004). *Econometric Theory and Methods*. **DM**

Wooldridge (2002). *Econometric Analysis of Cross Section and Panel Data*. **W**

**Papers.** Papers listed in **bold** are required reading and will be discussed in class during one of the meetings scheduled for the topic. Exact dates will be announced as we see how we are progressing. The additional papers listed are for reference for the interested student.

## Topics and Readings

Readings marked with a [\*] indicate that if I were you, and I had limited time to read non-required readings, I would prioritize these.

### Introduction and STATA Basics

- **Lecture Notes**
- [\*] CT-STATA Chapter 1

### STATA Programming

- **Lecture Notes**
- [\*] CT-STATA Chapter 1.5-1.8, 4

### STATA Descriptive Stats, Figures and Tables

- **Lecture Notes**
- [\*] CT-STATA Chapter 2

### STATA Data Management

- **Lecture Notes**
- [\*] CT-STATA Chapter 2

### Functional Forms

- **Lecture Notes**
- AP – Chapter 3, various parts
- CT-STATA Chapter 3.3
- CT – Chapter 4.1-4.4

### FWL and Multiple Regression

- **Lecture Notes**
- [Lovell\(2008\) A Simple Proof of the FWL Theorem, Journal of Economic Education, Vol. 39 No. 1 \(Winter 2008\)](#)
- DM pp. 68-?
- [Zax Textbook, Chapter 12, Section 12.4 pp. 26-35](#)

### The RCT/Treatment Effects

- **Lecture Notes**
- [\*] AP – Chapter 2
- W – Chapter 18

### Omitted Variable Bias

- **Lecture Notes**
- [\*] AP – Chapter 3.2
- DM – 2.4-2.5
- W – Chapter 4.3

### Panel Data – Fixed Effects, etc.

- **Lecture Notes**

- [Ashenfelter and Krueger \(1994\) Estimates of the Economic Return to Schooling from a New Sample of Twins, \*American Economic Review\*, Vol. 84, No. 5 \(Dec., 1994\) pp. 1157-1173](#)
- [McKinnish \(2008\) Panel Data Models and Transitory Fluctuations in the Explanatory Variable. \*Advances in Econometrics\*. Vol. 21 2008.](#)
- [\*] AP – Chapter 5.1, 5.3, 8.2
- [\*] CT-STATA Chapter 8
- CT – Chapter 21
- W – Chapter 10

#### Difference-in-Differences

- **Lecture Notes**
- [Davis \(2004\) The Effect of Health Risk on Housing Values: Evidence from a Cancer Cluster. \*The American Economic Review\*, Vol. 94, No. 5 \(Dec., 2004\), pp. 1693-1704](#)
- [Bertrand et. al. \(2004\) How Much Should We Trust Differences-in-Differences Estimates? \*Quarterly Journal of Economics\*, Vol. 119, No. 1, Pages 249-275](#)
-

- [Field and Ambrus \(2008\) Early Marriage, Age of Menarche, and Female Schooling Attainment in Bangladesh, \*Journal of Political Economy\*, Vol 116, No. 5, pp. 881-930](#)
- [\*] AP – Chapter 4
- [\*] CT-STATA Chapter 6
- CT – Chapter 4.8-4.9
- DM – Chapter 8
- W – Chapter 5, 18.4

#### Regression Discontinuity

- **Lecture Notes**
- [Imbens and Lemieux \(2008\) Regression Discontinuity Designs: A Guide to Practice. \*Journal of Econometrics\*. Volume 142, Issue 2, February 2008, Pages 615-635](#)
- [Matsudaira \(2008\) Mandatory Summer School and Student Achievement. \*Journal of Econometrics\*. Volume 142, Issue 2, February 2008, Pages 615-635](#)
- [\*] AP – Chapter 6

#### Selection

- [\*] CT-STATA - Chapter 16
- [\*] W – Chapter 17

#### Propensity Score Matching

- **Lecture Notes**
- [Smith and Todd \(2005\) Does Matching Overcome LaLonde's Critique of Nonexperimental Estimators? \*Journal of Econometrics\*, Vol 125, No. 1-2, pp. 305-353](#)
- [Dehejia \(2005\) Practical Propensity Score Matching: A Reply to Smith and Todd, \*Journal of Econometrics\*, Vol 125, No. 1-2, pp. 355-364](#)
- [Smith and Todd \(2005\) Rejoinder, \*Journal of Econometrics\*, Vol 125, No. 1-2, pp. 365-375](#)
- [\*] CT – Chapter 25.4
- W – Chapter 18.1-18.3

#### Propensity Score Reweighting

- [DiNardo, Fortin and Lemieux \(1996\) Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach \*Econometrica\*, Vol. 64, No. 5 \(Sep., 1996\), pp. 1001-1044](#)

#### Duration Models

- [\*] [Meyer \(1990\) Unemployment Insurance and Unemployment Spells. \*Econometrica\*, Vol. 58, No. 4 \(July 1990\), pp. 757-782](#)
- CT – Chapter 17
- W – Chapter 20

#### Binary Dependent Variables

- **Lecture Notes**
- [\*] CT-STATA Chapter 14
- CT – Chapter 14

- W – Chapter 15.1-15.8

#### Discrete Choice Models

- [Train \(2009\) Discrete Choice Methods with Simulation, Cambridge University Press](#)
- [\*] CT-STATA Chapter 15
- CT – Chapter 15
- W – Chapter 15.9-15.10