

**Courtney Coile**

**Spring 2007**

**Economics 203: Econometrics  
Wellesley College**

Office: Pendleton 420  
Phone: 283-2408  
Email: ccoile@wellesley.edu

Office Hours:  
Tues 2:45-4:15pm  
Wed 3:30-5:00pm  
and by appointment

Course Overview

Does going to college increase your earnings? Does raising a country's per capita income lead to a lower fertility rate? This course is designed to acquaint you with the statistical methods that economists use to test economic models and examine empirical relationships, primarily regression analysis. Although much of the course will focus on the mathematical development of the methodology, real world applications will be introduced frequently to demonstrate how these tools are used in practice. Students will learn to use a statistical software package, Stata, to analyze data. The final paper project will give students an opportunity to identify an interesting question and evaluate data to test their hypothesis.

Prerequisites

To enroll in this course, you must have taken the following classes or their equivalent: Economics 103 (formerly QR199), Economics 101 and 102 (may be taking 102 concurrently), and Math 115.

Readings

The required textbook for the course is Statistics and Econometrics: Methods and Applications by Orley Ashenfelter, Phillip Levine, and David Zimmerman (John Wiley and Sons, 2nd edition, 2006). The book is available at the college bookstore and will be on reserve at Clapp Library.

Course Meetings

The course meets on Tuesdays, Wednesdays, and Fridays from 9:50-11:00 in Pendleton 129. Tuesday and Friday class meetings will be used for lectures. Most of the Wednesday class meetings will be used for lab classes, which will generally be led by our TA, Heather Romani. Each of the lab classes will be structured around a short assignment designed to give you an opportunity to try out the concepts you've learned during the previous week; the assignment from each lab will be due the following Tuesday. The other Wednesday class meetings will be used for midterm review sessions and additional office hours for me to discuss your papers with you; see below for details.

Course Conference

You will automatically be subscribed to the course conference. Please get in the habit of checking it when you check your email (note that you have to click on the conference icon to see if there are any new messages in the sub-conferences). I will use the conference to make announcements and post assignments, handouts, and replies to "one-minute papers," and you can use it to ask questions of me or of your fellow students.

### Course Requirements

Grades will be based on problem sets (15%), two midterm exams (30% each), and a final paper (25%).

For the lab assignments, you should work in groups of two or three and turn in one assignment per group. Lab assignments should be turned in at the Tuesday class following the lab or emailed to the drop box section of the course conference by this time; late assignments will not be accepted.

For the final paper, you will work in groups of three to write an empirical research paper. Specifically, you will identify a topic and generate a hypothesis to be tested, review the literature to find other work in this area, find appropriate data, and evaluate the data to test your hypothesis using the methods learned in this class. Each group will have an opportunity to present its results to the class during the final two weeks of the course. It is critical to start working on the paper early in the semester to ensure that all these steps can be completed in time. To help you get an early start, each group will be required to submit a proposal on February 27 and some preliminary data analysis on April 10.

Both exams will be open-book, in-class exams. Midterm 1 covers units I-III on the syllabus and midterm 2 is cumulative with an emphasis on units IV-V.

## Syllabus

### I. Introduction

- Tues, Jan 30                      Introduction I: Introduction to Econometrics  
*ALZ, Chapter 1*
- Wed, Jan 31                      Lab 1: Reviewing Statistics  
*ALZ, Appendix A (read) and Chapters 2-8 (review as needed)*
- Fri, Feb 2                        Introduction II: Controlled Experiments  
*Bertrand and Mullainathan, "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination"*

### II. The Simple Regression Model

- Tues, Feb 6                      Simple Regression I: Introduction  
*ALZ, Chapter 9.1-9.3*  
**Lab Assignment 1 Due**
- Wed, Feb 7                      Lab 2: Learning Stata
- Fri, Feb 9                        Simple Regression II: Estimating the Parameters  
*ALZ, Chapter 9.4-9.5*
- Tues, Feb 13                    Simple Regression III: Properties  
*ALZ, Chapter 10.1-10.3, 10.7*  
**Lab Assignment 2 Due**
- Wed, Feb 14                    Lab 3: Running Simple Regressions
- Fri, Feb 16                      Simple Regression IV: Hypothesis Testing  
*ALZ, Chapter 10.4-10.5*
- Tues, Feb 20                    Simple Regression V: Goodness of Fit  
*ALZ, Chapter 10.6*  
**Lab Assignment 3 Due**
- Wed, Feb 21                    No Lab; Available to Discuss Papers (PNE 420)

### III. The Multiple Regression Model

- Fri, Feb 23                      Multiple Regression I: Introduction  
*ALZ, Chapter 11*

|                |   |
|----------------|---|
| Tues, Feb 27   | Multiple Regression II: Dummy Variables<br><i>ALZ, Chapter 12.1-12.2</i><br><b>Paper Proposal Due</b>                     |
| Wed, Feb 28    | Lab 4: Evaluating Statistical Significance and Goodness of Fit  |
| Fri, March 2   | Multiple Regression III: Categorical Variables/Interaction Terms<br><i>ALZ, Chapter 12.1-12.2</i>                         |
| Tues, March 6  | Multiple Regression IV: Hypothesis Testing<br><i>ALZ, Chapter 12.3</i><br><b>Lab Assignment 4 Due</b>                     |
| Wed, March 7   | Lab 5: Running Multiple Regressions   |
| Fri, March 9   | Multiple Regression V: Using the Concepts<br><i>Hakes and Sauer, "An Economic Evaluation of the Moneyball Hypothesis"</i> |
| Tues, March 13 | Midterm Review<br><b>Lab Assignment 5 Due</b>   |
| Wed, March 14  | <b>** Midterm 1 **</b>  |
| Fri, March 16  | No Class  |
| March 19-23    | Spring Break – No Classes   |

#### **IV. Violations of Assumptions**

|                |   |
|----------------|---|
| Tues, March 27 | Violations of Assumptions I: Model Specification<br><i>ALZ, Chapter 13.1-13.4</i>                                 |
| Wed, March 28  | Lab 6: Exploring Errors in Model Specification  |
| Fri, March 30  | Violations of Assumptions II: Multicollinearity<br><i>ALZ, Chapter 13.5-13.6</i>                                  |
| Tues, April 3  | Violations of Assumptions III: Heteroskedasticity<br><i>ALZ, Chapter 14.1-14.2</i><br><b>Lab Assignment 6 Due</b> |
| Wed, April 4   | No Lab; Available to Discuss Papers (PNE 420)   |
| Fri, April 6   | Violations of Assumptions IV: Heteroskedasticity/Serial Correlation<br><i>ALZ, Chapter 14.1-14.3</i>              |

Tues, April 10                      Violations of Assumptions V: Serial Correlation  
*ALZ, Chapter 14.3*  
**Paper Summary Statistics Due**

Wed, April 11                      Lab 7: Exploring Heteroskedasticity and Serial Correlation

## **V. Additional Topics**

Fri, April 13                      Additional Topics I: Panel Data Models  
*ALZ, Chapter 18*

Tues, April 17                      No Class (Monday Schedule)

Wed, April 18                      Lab 8: Using Panel Data  
**Lab Assignment 7 Due**

Fri, April 20                      Additional Topics II: Dummy Dependent Variable Models  
*ALZ, Chapter 16*  
*Anderson, Butcher, and Levine, "Maternal Employment and Overweight Children"*

Tues, April 24                      Additional Topics III: Natural Experiment Techniques  
*Lavy, "Do Gender Stereotypes Reduce Girls' Human Capital Outcomes? Evidence from a Natural Experiment"*  
**Lab Assignment 8 Due**

Wed, April 25                      Midterm Review

Fri, April 27                      **\*\* Midterm 2 \*\***

## **VI. Class Presentations**

Tues, May 1                      How to Present a Research Paper

Wed, May 2                      Ruhlman Conference – No Class

Fri, May 4                      Class Presentations I

Tues, May 8                      Class Presentations II

Wed, May 9                      Class Presentations III

Mon, May 14                      **Final Paper Due**