

**Williams College Center for Development Economics**  
**ECON 502: Statistics/Econometrics**  
**Fall 2013**

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Class meets: Tuesday and Thursday 11:20-12:35 AM, CDE classroom

Office hours: Tuesday 1:15-2:15 PM at the CDE and by appointment in my office

**Course objectives:**

This course provides an introduction to statistical data analysis and econometrics, focusing particularly on the application of empirical analysis to public policy in developing and transition economies. The goal of the course is to provide greater proficiency in the following areas:

- 1) data analysis and economic statistics;
- 2) econometric analysis, with a focus on the strengths and weaknesses of linear regression as a tool for policy analysis; and
- 3) empirical economic research—to learn to interpret and evaluate empirical evidence pertaining to economic problems.

The emphasis in the course is on intuitive understanding of the central concepts. Through hands-on work with data and critical assessment of existing empirical economic research, you will develop the ability to choose and employ the appropriate tool for a particular research problem, and to understand the limitations of the techniques.

**Course structure:**

The course is structured in three parts: 1) statistical data analysis; 2) the linear regression model; and 3) extensions to the linear regression model. There will be one midterm, six problem sets (the best five of which count towards your grade), two quizzes, a final exam, and a mini empirical group project. Grades will be based on the following weights:

Orientation homework and exam	5%
Quizzes	10%
Midterm	25%
Final	30%
Problem sets and class participation	20%
Mini empirical project	10%

*Improvement will be rewarded by weighting the final exam more heavily and reducing the weight on the midterm if that is to your benefit.*

**Course reading and computer resources:**

The required text is James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 3<sup>rd</sup> ed., Pearson Education, 2011. The international edition and the second edition are acceptable substitutes, but you are responsible for figuring out any discrepancies between the editions'

chapter, section, page, or problem numbering. Note that the first edition is **NOT** an acceptable substitute, as the authors made some important changes between the first and second editions.

You are expected to complete all assigned reading. It is a very good idea to read the assigned material before coming to class, and then review it again after class. Additional reading, including relevant empirical articles, will also be assigned to supplement the text. These will be handed out in class, as will lecture notes. Any class handouts, all problem sets, and datasets to be used in the course will be posted on Williams' online course management system Glow2. You can expect that materials will be posted by the end of the day on which the hard copy version was handed out. Please let me know if you have any difficulty finding or accessing any of the materials.

We will be using the statistical package Stata and, for producing some graphs, Excel. Stata is available in both PC and Mac versions, and should be installed on all lab computers. In addition, it is keyserved software, so you can use it on your own computer as long as your computer is connected to the campus network. It can be downloaded from the OIT webpage (choose Stata IC 12 (Stata)). **You must install the keyserver application KeyAccess first** (also downloadable from the OIT webpage). If you have any difficulty installing Stata on your computer, the student help desk at x3088 should be able to help you.

#### **Problem sets:**

The problem sets are one of the most important parts of the course, as data analysis and econometrics require much practice to master. In order for you to develop proficiency in data analysis, all problem sets will include empirical exercises to be done using the computer. Group collaboration on the problem sets is encouraged, however each student must hand in his or her own problem set, written in his or her own words. It is essential that you understand the problem yourself, and have not just relied on the understanding of others. ***Turning in a problem set answer that is identical to or even essentially the same as another student's problem set is a violation of the honor code, and will be dealt with accordingly.*** Problem sets will be graded on a plus, check-plus, check, check-minus scale. The lowest problem set grade will not be used in determining your overall grade.

#### **Mini empirical group project:**

To develop your intuition about regression analysis, as part of a group you will complete an original empirical project, generate regression tables, and answer written questions about your work.

#### **Quizzes, midterm, and final exam:**

The midterm will be held on Wednesday, 2 October from 9-11 AM. The final exam will be on Friday 12 December from 9:30-noon. We will discuss the procedures for these exams as the time approaches. There will be two short (30 minutes) in-class quizzes on September 18 and November 11, which are designed to test your mastery of smaller amounts of material.

**Getting help:**

For many students this will be the most challenging course they face this semester. It is imperative that you get help early if you need it. Learning statistics and econometrics is a cumulative experience. It is essential that you not fall behind, so if you are having difficulty with the material, do not wait to get help! There are four places to turn for support:

1) Your classmates. They are a great resource. Study together, ask each other questions, and work with each other on problem sets. (Remember problem sets must be your own work in your own words when they are submitted.) Classmates with a good understanding of a topic will benefit from assisting others, so do not be shy about asking for help.

2) The teaching assistant (TA) is Patrick Daly. He is an undergraduate who has TA'd for econometrics before. He will hold weekly review sessions at the CDE, and is also available to provide extra help one-on-one. He can be reached via e-mail at [Patrick.Daly@williams.edu](mailto:Patrick.Daly@williams.edu).

3) Mohsina Atiq and Sultan Toure. They are available to answer questions and give one-on-one help as needed.

4) Me. I will hold weekly office hours to answer questions. I am also available to answer questions at other times—just talk to me to set up an appointment. You may also e-mail questions to me anytime, and I will do my best to respond within 24 hours. However, do not wait until the last minute to ask for help.

**Classroom etiquette:**

I have great respect for the CDE fellows and I expect you to show respect for each other. In a classroom setting, this respect entails coming to class on time, not using cell phones for any reason at any time, including for sending or receiving texts, not using a laptop or tablet for anything other than taking notes or the in-class computer exercises, not holding “side conversations,” and refraining from exiting and re-entering the room excessively. At the same time, questions and discussion are crucial for learning, so please don't be shy about speaking up in class. If you have a question or are unsure about something, please ask me rather than your neighbor, as others are likely to have the same question and will benefit from hearing the answer.

**Academic honesty:**

The Honor Code applies to all work submitted and exams taken in this class. You may collaborate on the problem sets, however as noted above, the work you turn in should be written up independently. You may also collaborate in studying or preparing for the exams, but the written exam should be your work alone. The group project is entirely collaborative with the members of your group—each group will do the analysis and turn in a single report representing the work of the entire group.

### Course topics and textbook reading list:

("SW" indicates reading from the Stock and Watson text, "Glow2" indicates reading available on Glow2.)

<u>Class</u>	<u>Date</u>	<u>Topic and reading</u>
1.	Thursday 4 Sept.	Overview of course and review of probability SW: Chapter 1

#### Probability, Random Variables, and Distributions

2.	Tuesday 9 Sept.	Continued review of probability and statistics SW: Chapter 2.1-2.6 Glow2: Mansfield, Edwin. <i>Statistics for Business and Economics</i> , 5 <sup>th</sup> ed. New York: W. W. Norton, 1994, pp. 83-115. Mansfield, Edwin. <i>Basic Statistics with Applications</i> . New York: W. W. Norton, 1986, pp. 129-147. Beals, Ralph. <i>Statistics for Economists: An Introduction</i> . Chicago: Rand McNally & Company, 1972, pp. 110-134.
3.	Thursday 11 Sept.	Statistical inference: point and interval estimation SW: Chapter 3.1-3.3 <i>Problem set 1 due</i>

#### Statistical Estimation and Inference

4.	Tuesday 16 Sept.	Testing hypotheses SW: Chapter 3.4-3.6
5.	Thursday 18 Sept.	Testing hypotheses, continued <i>In-class quiz #1</i>
6.	Tuesday 23 Sept.	Examining relationships between variables: covariance, correlation, and regression SW: Chapter 3.7
7.	Thursday 25 Sept.	The simple regression model SW: Chapter 4 <i>Problem set 2 due</i>
8.	Tuesday 30 Sept.	Simple regression, continued
9.	Thursday 2 Oct.	Hypothesis testing in the two-variable model SW: Chapter 5.1-5.4
10.	Tuesday 7 Oct.	Stata Lab 1: Multiple regression

11. Thursday 9 Oct. Omitted variables bias and causality  
SW: Chapter 6

*Tuesday 14 Oct. No class–Reading Period*

Linear Regression

12. Thursday 16 Oct. Hypothesis testing in multiple regression  
SW: Chapter 7  
*Problem set 3 due*

13. Tuesday 21 Oct. Midterm review

**Wednesday 22 Oct.** *Midterm exam, 8:30-10:30 AM*

14. Thursday 23 Oct. Regression specification: nonlinear functions of variables  
SW: Chapter 8.1-8.4

15. Tuesday 28 Oct. Regression specification, continued: interactions  
Re-read SW Chapter 8.1-8.4

16. Thursday 30 Oct. Stata Lab 2  
*Problem set 4 due*

17. Tuesday 4 Nov. Assessing regression based studies and review  
SW: Chapter 9

18. Thursday 6 Nov. An application of dummy variables: simple panel data methods  
SW: Chapter 10

19. Tuesday 11 Nov. More on panel data; Regression with a binary dependent variable  
SW: Chapter 11.1-11.2  
*In-class quiz 2*

Regression: Beyond the Basics

20. Thursday 13 Nov. Instrumental variables  
SW: Chapter 12  
*Problem set 5 due*

21. Tuesday 18 Nov. Instrumental variables, experiments, and quasi-experiments  
SW: Chapter 13

22. Thursday 20 Nov. Review of quasi-experimental methods

23. Tuesday 25 Nov. Introduction to time series regression  
SW: Chapter 14  
Glow2: Notes from Prof. Ken Kuttner  
*Mini-project due*

*Thursday 27 Nov. No class–Thanksgiving*

24. Tuesday 2 Dec. More on time series  
Re-read SW Chapter 14

25. Thursday 4 Dec. Review and catch-up  
*Problem set 6 due*

*Final Exam Friday 12 Dec. 9:30-noon*