Applied Econometric Analysis

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Econ 570
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Purpose

The goal of this course is to have a lot of fun while learning something about econometrics.

What is Econometrics?

Think about your other courses in economics. We can summarize the course content as follows: Two lines intersect at a point. The intersection moves around as you shift the lines.

Have you noticed anything missing? Where are those lines in the real world? Econometrics is the science (or art) of trying to figure out where the lines in an economic diagram are by using **real data**. This an immensely practical goal (at least relative to other things you have studied).

For example, econometrics attempts to determine how much sales will increase in numerical terms if you cut the price a specific amount. In other words, we will seek a numerical estimate of the slope of the demand curve, which is the first step in actually maximizing profits.

Textbook

We will be using *Introduction to Econometrics* by Christopher Dougherty, Fifth Edition. A study guide and data are available online.

Web Sites

You will find our course web site at http://parke.econ-courses.com. I also post useful information at http://www.easymetrics.net.

Stata

We will be doing exercises using the Stata statistical package. This is available for purchase, it is on computer lab machines, and it is available via high-speed Internet from the UNC Virtual Computing Laboratory http://vlc.unc.edu.

How much math do I need to take this course?

You need the same amount of math you need to be a reasonably well educated graduate of UNC. You should be comfortable with college algebra. That means you should be able to work with symbols to solve problems. You should know what calculus is, but you do not need to actually do any calculus.

How are the grades awarded?

We will have an assortment of exercises using both pencil and paper and Stata, two research projects (40 points total), two midterms (40 points each), and a final exam (80 points). Grades will be awarded on a total points basis with one exception. All these course elements are required. Students who do not

complete the homework or research project components of the course will receive a reduced or failing grade for the course regardless of their exam scores or total points.

Personal Electronic Devices

Unless explicitly authorized, you are not permitted to use a laptop computer, tablet computer, smart phone, or cell phone during class. If your cell phone is set to vibrate and it does so during class, please step into the hallway if you need to respond. Watching movies and videos, playing games, checking the scores on espn.com, shopping, and chatting/texting/tweeting with friends are disruptive behavior that will not be tolerated.

Outline

We will cover the following topics. The references beginning with "D-" refer to chapters and pages in the textbook.

A. Introduction

B. Probability & Statistics D-R
Random Variables & Moments
aX+b Rules
t Tests
Confidence Intervals

C. Simple Regression (2var) D-1,2
Why is the estimated slope stochastic?
Assumptions
Distribution of beta-hat
t Tests

D. Multiple Regression (3var) D-3,6
Controlling For
Specification Analysis
F Tests D-180,274
How do you pick the best model?

E. Categorical Explanatory Variables D-5
Dummy Variables
F Tests Revisited
Chow Tests
Subsamples & Controlling For

F. Categorical Dependent Variables D-10

Logit/Probit

G. Nonlinearity D-4

Functional Form
Logarithms & the Exponential Function
The Cobb-Douglas Production Function

H. Problems with the Errors

Serial Correlation D-12
Heteroskedasticity D-7

I. Simultaneity D-8,9

Supply and Demand
Instrumental Variables
Identification

J. Time Series Data D-11,13

Distributed Lags and Lagged Dependent Variable
Forecasting
Panel Data D-14

Research Papers

During the term you will complete two research projects. Both will produce written papers.

The Income Project will use data from the U.S. Current Population Survey from the Bureau of Labor Statistics (http://www.bls.gov). I will supply about 200,000 observations from each of three years in the form of Stata datasets. You will propose a research question that can be addressed using this data and turn in a written paper that shows your results.

The Term Paper will use data that you draw from a source that you determine. You will propose a research question that can be addressed using this data and turn in a written paper that shows your results.

To complete these two research projects you will meet with me in my office (not in the classroom) to discuss the following three progress reports for each research project.

1. Topic. You will provide a short statement of the research topic you will be investigating. There is a form for this progress report. You will also show me where you will be obtaining your data. Evidence that you have actually obtained your data is best. I will approve your topic or tell you to come back with a revised or different topic.

2. Empirical Results. We will review our empirical results before you write your final paper. Please bring in your preliminary results.

3. Rough Draft. We will review a draft of your paper.

As a capstone activity, you will read and review two papers written by other students. Your reviews have nothing to do with my grading process for the papers you review. The reviews are intended to give you additional perspective on how people approach empirical econometrics.

*Completing two research projects and two midterms in one semester is a challenge. The number of research projects and midterms may be adjusted in light of snow days, summer semester, etc. The research project component of the course will be worth 40 points and the midterms will be worth 40 points each in any case. Students who do not satisfactorily complete the homework or research project components of the course will receive a reduced or failing grade regardless of their exam points.