Introduction to Econometrics

Course syllabus

Introduction to Econometrics (3 credits)

Instructor:

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Office hours: Tuesday 2-4pm.

Prerequisites: Basic knowledge in Economics and Statistics

Summary:

Econometrics is the science (and art) of confronting economic models with data for the purposes of testing the models, of predicting future events, or of advising policy makers, managers, lobbyists, etc. Mathematically, we will be strongly relying on statistics. We will begin by refreshing our knowledge of probability theory, and much talk will be about regression coefficients and hypothesis tests.

An important difference to "normal" statistics is the focus on economic data, which are typically not generated by proper experiments. As a result, statistical methods often need to be substantially adapted. Frequently, we will attempt to compensate for problems with data quality by using knowledge (or at least assumptions) from economic theory. This means that to do econometrics well, you need to know your economics and not just your statistics. At the same time, large parts of the course will be useful as statistics for social sciences more generally.

This course is designed for a wide range of students, from those who feel that econometrics is some strange mutation of economics that is difficult to understand, let alone apply, to those who are planning graduate work in economics, and finally to those who love statistical economics (of whom I hope there are many). No matter who you are, though, you should be confident that by the time you leave this course, you will understand that 'the application of statistics to the study of economics,' while perhaps different from what you have seen before, is in fact feasible, if not fun!!! Also, I believe that a basic understanding of econometrics can substantially expand your job opportunities, particularly if you're planning to graduate and enter the job market in the relatively near future. To illustrate the essentials of what we will be doing throughout the course, consider that most statistics used in econometrics are constructed by just taking averages of numbers! Actually, this is something you all already do, whenever you add up your exam and assignment grades in a course, and come up with your total points, or average points, for example. This is all we're going to do in this course, but we're going to learn how to do it well!!

Textbook:

Wooldridge, J. (2012): *Introductory Econometrics: A Modern Approach, 5th ed.*

(The access code unlocks additional services from the publisher but is not required. Also, the 4th and 5th editions are very similar.)

Optional:

Gujarati, Damodar: Basic Econometrics, any Edition, McGraw-Hill Inc.

Stock, James H. and Mark W. Watson: Introduction to Econometrics, 1st Edition, Addison-Wesley, 2003.

If you want to brush up on some basic probability and statistics, a good text is:

Newbold, Paul: Statistics for Business and Economics, any edition, Prentice Hall.

Course/Module Content:

1. Simple regression model with one regressor. Ordinary least squares (OLS) estimator.
2. Multiple regression model
3. Testing hypotheses in the regression model
4. Asymptotic properties of estimators
5. Dummy variables, qualitative data
6. Nonlinear relationships, change in units of measurement, goodness of fit
7. Heteroskedasticity
8. Multicollinearity
9. Time Series, Max Likelihood Estimation
10. Endogeneity and Instrumental Variable estimation
11. Simultaneous equations
12. Estimation methods with panel data

Assessment:

There will be about eight homework counting toward a total of 25% of the grade. One of these homework will be an "empirical project," that is, an extensive homework centered on one data set. Other homework will involve both theoretical and practical (i.e., working with data) exercises. Your weakest homework other than the empirical project will be dropped from consideration.

Your grades will be based on a combination of homework, 2 assignments, and a final exam
25%: for homework
20%: 10% for each of 2 Assignments
55%: Final exam

In particular, for the assignments, I recommend team work. Note however that each member of a team must hand in her/his own assignments. For the assignments, the teams or groups can be any size. Also, working together is advantageous to all. The assignments are due at the BEGINNING of the class. In terms of the project, the maximum group size will be 5, and ONLY ONE paper need be handed in per group. The project is due on the last day of lectures. The project should be a typed 7-10 page paper discussing the econometric analysis of an issue you want to analysis. I will provide you with multiple datasets, from which you can choose any variables to examine.