

Econometrics (BC3018)

Barnard College, Columbia University
Spring 2016

Instructor: Aboozar Hadavand (ahadavan@barnard.edu)
Class Time: MW 2:40-3:55 Office Hours: MW 1:30-2:30
Class Location: Milbank Hall 328

TA: Somayeh Ahmadi (sahmadi@gradcenter.cuny.edu)
TA Recitation Session: T 1:10-2:00 TA Office Hours: T 2:00-3:00
Recitation Location: Milbank Hall 222



Course Description

Econometrics is the application of regression analysis in economics. You will empirically learn how economic (or in a broader context socio-economic) variables are related. This is the core of the subject of econometrics!

Econometrics isn't always the easiest subject to study and it doesn't always have a reputation for being particularly enthralling either. However, my intention in this course is to avoid unnecessary mathematics or statistics and to avoid the introduction of econometrics concepts that are beyond the scope of an undergraduate student who is learning econometrics for the first time. I also try to teach concepts through examples, so the learning process is from examples to concepts and not the other way around. Examples are designed to make econometrics both easy and interesting. My goal is to walk you through the intuition behind econometrics in six easy modules like six steps:

1. Understanding the Problem

We first need to understand what econometrics is used for. We'll explore some problems that econometrics can help us understand.

2. Grabbing Your Tools

We need to equip ourselves with the statistical tools we will need for the rest of the course.

3. Building Models

We'll find the relationship among variables by building our first econometric model. We will focus on the simplest method of doing so.

4. Testing Models

Now that we've built a model, we need to make sure how reliable our model is and whether the results hold under different sampling. This part is called hypothesis testing.

5. Tweaking Models

We will then learn how to tweak the model we built in previous steps in order to make sure it is the best model we can build.

6. and More...

In the last part of the class, we'll go beyond standard methods and learn more advanced topics.



Learning Objectives

In this course you will:

Learn methods for estimating causal relationships between socio-economic variables using observational data; learn how to use the software (R) to better analyze econometric problems; learn to evaluate the regression analysis of others researchers – this means you will be able to read and understand simple empirical economics papers in your other economics courses; develop your skills in analyzing microeconomic, macroeconomic, or social policy questions such as:

- What is the effect of income on subjective well being?
- What is the effect of smoking bans in workplaces on smoking?
- What is the effect of education on earnings?
- How do households react to changes in gas prices?
- What is the effect of public debt on growth rates across countries in the world?



Suggested Readings

Current mainstream textbooks in the subject are often littered with technical language and mathematical formulas. Besides that, these textbooks often cost hundreds of dollars. Although there are some suggested texts that I have listed here, there will be no required textbook for this course. I will be using material that I, with the help of another friend, Sarah Thomas, co-wrote over the course of my short teaching career. The material is available on the website www.artofmetrics.com.

Art of Metrics is an online platform for students interested in studying econometrics. The main goal is to make econometrics a much more intuitive and engaging subject for students to learn. The platform includes online course material in six modules, explanatory videos, problem sets and quizzes, and embedded consoles for the statistical analysis software R. Although access to the material is blocked for everyone else, you will be provided free access to all of the material, problems, and quizzes.

Suggested supplementary readings are (Note that the following books are not mandatory but are recommended as complementary sources to the course):



Econometrics by Example, 2nd Edition,
By: Damodar Gujarati, ISBN: 9781137375018
Publication Date: December 2014, Publisher: Palgrave Macmillan
Amazon Link: <http://amzn.com/1137375019>



Mastering 'Metrics: The Path from Cause to Effect
By: Joshua Angrist & Jörn-Steffen Pischke, ISBN: 9780691152844
Publication Date: December 2014, Publisher: Princeton University Press
Amazon Link: <http://amzn.com/0691152845>



Schoology

I use a free service called Schoology to communicate with you outside the classroom.

Registration for the class on Schoology is very easy. Please go to www.schoology.com and sign up as a student with your official name (skip this step if you already have an account). You are required to use the class code 4M6JK-S9CWR.

Please use an email that you regularly check so you don't miss any announcements. I'll post assignments, answers to assignments, sample exams, your grades, as well as, important announcements such as exam dates on Schoology. You can also download the Schoology app on your smartphones.



Grading Policy

Evaluations for this class are determined as follows. Grades will be curved at the end of the semester.

Class participation and quizzes: 10%
Assignments: 10%
Term project: 10%
Midterm: 30%
Final: 40%



Class Participation

Class participation is 10% of your final grade. During class time, I will call on students and ask questions about the lecture. We'll also have pop quizzes from time to time which are usually from the material covered in the same class. Quizzes are open note. The grade for quizzes will go towards class participation. Use of phones for any purpose in the class is forbidden, but you may use your computer or tablet for the purpose of taking notes.



Assignments

Homework assignments are given on a regular basis. There is no requirement as to which software you use for doing your homework. I will not accept late homework under ANY circumstance since enough time is given to complete them.

While you are allowed to work on homework assignments together you are required to submit your own version written specifically by you. No credit will be given to assignments that are exact replicas of others.



Term Projects

There is a term project that is due at the end of the semester on the day of the final exam. The procedure for submitting the paper is as follows:

1. You will be assigned a partner and together with your partner you are required to think of a project topic that you're both interested and confident that you can find data for. You then need to submit your topic to me by the midterm exam date. You can consult with me or your TA if you're struggling to decide on a topic.
2. Once your project topic is selected and approved by me, the next step is to read related literature (other people's work on the topic) and make a presentation about the topic. Your presentation is short (15 minutes together with your partner) and should include reasons why it's important to study the topic, review of the literature, where you'll obtain your data from, and finally what your initial hypothesis is (30% of your project grade will go towards this presentation). The presentations will take place starting the first session after the midterm exam.
3. Finally, start analyzing the topic. You are not required to present your final results in the class, however, at the end of the semester you will need to submit a paper together with your partner. The paper should include an introduction, description and statistical summary of your data, your regression model, your results and their interpretation, and a conclusion. You also need to cite any sources you use at the end of your paper.



Midterm/Final Exams

The midterm will cover the material presented in the classes prior to the midterm. The final exam is cumulative, and covers any of the material presented in the course. The midterm exam will be on Wednesday, March 2. The final exam time will be announced later.

If you know in advance that you have a conflict with the midterm or final exam dates, either due to religious beliefs or other reasons, please see me during the first two weeks of class. Unless scheduled in advance, no make-up exam will be provided for the midterms or the final, except in the case of an emergency, documented with either a doctor's note or a letter from Barnard College. There will be no make up for in-class quizzes, unless there is a conflict with your other academic responsibilities and you notify me in advance.

Exams for this course require a calculator. You are responsible for bringing your own to the exam. Use of phones, computers, tablets, or notes are strongly prohibited. Exams are closed book.



Extra Credit Bootcamp

On May 2, the last day of the semester, we will have a bootcamp session during which the class is given a question to work on. The purpose of the session is for you to build an econometric model from scratch. You're supposed to find data relevant to the topic, build, test, and tweak your model and submit a short summary of your work along with your results at the end of the session. You are responsible for bringing your computer to the class (we can make some arrangements if you can't but you need to inform me in advance). You'll be randomly assigned to a partner to work with. Attendance for this session is optional and the grade for your submission will be counted as extra credit. The best 4 teams will receive 4 points, the next 4 will receive 3 and so on.



Recitation Lab

During the lab session, your TA, Somayeh, will teach you basic use of the software R. Computers in the computer lab have R locally installed. During the semester she will go over your assignments and you'll be asked to work on the empirical problems in your assignment during the session.



About R

R is the most powerful statistical software that is also FREE! Why is it powerful and why is it free?

R is a public domain project and is open source. Meaning the program, although initially started by researchers at University of Auckland in New Zealand, it's being developed by thousands of researchers around the globe. Each user-written package sits on the core program, developed by R Development Core Team, and gives users more analytical power. This gives R boundless power since the development of the software happens every second. Every day a researcher somewhere around the world is adding a package to the core program. R now contains 150 times as many commands as SAS, for instance. The core development team makes sure the core program is always running and functioning under various operating systems such as Mac, Windows, and Linux.

R is also a GNU project meaning it's under a General Public License, therefore, its use is totally free. This is the best advantage of R over other statistical softwares. Most statistical softwares don't come this cheap. Although most companies offer student discounts, once you graduate you'll have to pay in some cases up to \$6,000 annually to use such statistical softwares. The table below shows the discounted version of the most famous statistical softwares for students.

You can read more about R and how to install it on the Art of Metrics website.



Barnard College Honor Code

We, the students of Barnard College, resolve to uphold the honor of the College by refraining from every form of dishonesty in our academic life. We consider it dishonest to ask for, give, or receive help in examinations or quizzes, to use any papers or books not authorized by the instructor in examinations, or to present oral work or written work which is not entirely our own, unless otherwise approved by the instructor. We consider it dishonest to remove without authorization, alter, or deface library and other academic materials. We pledge to do all that is in our power to create a spirit of honesty and honor for its own sake.



Accommodations

Disabled students who need test or classroom accommodations must be registered in advance with the Office of Disability Services (ODS) in 105 Hewitt.