Economics 570

Applied Econometric Analysis

Spring 2020

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1. Information

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2. Course Description and Goals

This course develops statistical and empirical methodologies for analyzing data in order to test economic and financial hypotheses, make policy recommendations, and forecast unknown events. We review statistical theory of estimation and hypothesis testing. We then proceed by studying classical linear regression theory: the theory and practice of building, estimating, and testing econometric models of economic data/information/behavior. The theoretical topics covered in the course prepares the students for more advanced topics associated with the econometrics analysis of economic behavior in, for example, labor economics, macroeconomics and finance. Throughout the course we will pay close attention to the details of conducting empirical work in economics and econometrics with real-world datasets using computational software. With this in mind, assignments will frequently focus on empirical and computational demonstrations of the theory studied in lecture.

Major goals and take-aways from this course are (1) the student's ability to do empirical research, and (2) the student's understanding of why econometric methods work.

3. Prerequisites

Econ 400 (Statistics), Econ 410 and 420 (Intermediate Microeconomics and Macroeconomics), and at least one semester of differential calculus.

4. Questions for Students

As part of UNC's curricular "Ideas in Action", we pose the following questions:

a. *How do I establish my point of view, take intellectual risks, and begin producing original scholarship or creative works?*
b. *How do I narrow my topic, critique current scholarship, and gather evidence in systematic and responsible ways?*
c. *How do I evaluate my findings and communicate my conclusions?*

5. Learning Outcomes

As part of UNC's curricular "Ideas in Action", the present course aims to achieve the following goals:

a. *Frame a topic, develop an original research question or creative goal, and establish a point of view, creative approach, or hypothesis.*
b. *Obtain a procedural understanding of how conclusions can be reached in a field and gather appropriate evidence.*
c. *Evaluate the quality of the arguments and/or evidence in support of the emerging product.*
d. *Communicate findings in a clear and compelling ways.*
e. *Critique and identify the limits of the conclusions of the project and generate ideas for future work.*

6. Personal Electronic Devices

Unless explicitly authorized by me (the professor), you are not permitted to use a laptop computer, tablet computer, smart phone, or cell phone during class. Watching movies and videos, playing games, checking the scores on espn.com, shopping, and chatting with your friends are disruptive behavior that will not be tolerated.

7. Course Resources

Consult the Resources link in the Sakai course site for STATA resources, assignments and answer keys (once they are posted), practice exams, course data sets and online data set links.

8. Required Test Book

"*Introductory Econometrics: A Modern Approach*" 7th edition, Jeffrey Wooldridge, 2020

You may use an earlier edition, but not too early. The 5th edition is free online: click here. The 7th can be found on ebay, and rented.

9. Software

We will use STATA, a major econometrics software with command prompt (instantaneous commands, one-by-one) and programmable interface (for writing and storing code to run more detailed programs). Students must obtain STATA on their own: 30% of the course grade will be based on econometric software use. See below for options for obtaining STATA.

Students are required to use the STATA econometrics/statistics programming package. In principle you can use any version available to you, but I will only provide documentation for STATA. You need to obtain a copy of, or access to, **STATA IC 16** *or a similiar recent version*.

STATA SE 16 handles massive data sets and is therefore expensive. *We do not need such power*!!

STATA IC is cheaper and handles less data than STATA SE, but it is perfectly adequate for all that we do. I use it!!! You can purchase **STATA IC** for $95/year.

Go to STATA Gradplan to view options for *student purchases*.

BUY IT SOON: there will not be any homework extensions if you decide to wait.
If you want to buy it via UNC, go to UNC Software Aqcuisition. Their links simply sends you to STATA's web-site.

10. STATA Write-Up

Before you do any STATA write-up for homework assignments, consult the ***Write-Up Examples*** and the ***STATA: Bad/Good Writeup*** documents to see what clean, compact write-ups look like, and what bad write-ups look like. Since this is a 500-level course, grading on these write-ups will be very strict.

Your STATA grade will be based 50% on the accuracy of what you did, and 50% on the write-up itself.

NEVER JUST COPY-PASTE STATA OUTPUT: if all you do is copy-paste STATA output your grade will be 0. The main problem is the output looks terrible, and it always contains far more than was asked for. Also, it will likely always be the case you do not even recognize much of the output. Thus, take what STATA provides and condense and present the material in neat tables, or graphs, as the per the assignment.

NEVER REPORT OUTPUT YOU DO NOT UNERSTAND. This goes with the above: if you do not understand the output, odds are you were not even asked to report it. Only report what you are asked to do. *And report that material very neatly*.

11. Course Structure

There will be two exams (midterm, final), a research project, and several (about 4) homework assignments based on econometric theory and based on using STATA. The breakdown follows:

Midterm Exam: 20%
Final Exam: 20%
Homework: 25%
Research Project: 35%

Under no circumstances will late homework assignments be accepted, including legal/medical emergencies and school sanctioned events. Students can, however, turn homework in early. Homework cannot be emailed (I will delete the email without even reading the attached homework), cannot be placed in my mail box, nor placed under the door of my office. *There are no exceptions*.

In case of emergencies or school sanctioned events, with a valid excuse (i.e. written official documented proof) students may have their homework grade re-weighted.

12. Late Assignments

Late assignments are never accepted. ***Assignments placed in my mail box, or slid under my office door, are treated as late***, no matter what, *no matter when or why they are place there*. You may never use my mail box or slide material under my door. These will be ***thrown away***. If you have a documented emergency, once you are able to contact me I will then re-weigh your homework score.

13. Research Project

13.1 Students will ***work in pairs*** to write a course paper based on collected data, using econometric methods studied in class (and other methods, too, where applicable). This project will allow students to hone their research skills, and apply econometric skills learned in (and outside of) class.

The paper must be 15-20 pages (double spaced, 12pt font). Figures and tables need to be neat and readable by anyone (*with* or *without* an education in economics or econometrics).

Table and figure font should be 10pt, with single spacing.

13.2 Citations must be of the style used in the academic journals *American Econometric Review* or *Econometrica*. Read articles there to see how journal articles, unpublished scholarly papers and books are entered bibliographically

13.3 Time Line

a. Proposal and dataset due Feb.13, 2020
b. Presentation: project questions, dataset details, any findings so far: 10 minutes: March 24-26
c. First Draft Due April 2, 2020.
d. The final project is due on the final day of class, in lecture, Thurs. April 23, 2020.

14. Tentative Lecture Schedule

Week	Topic	Chapter (text book)
1	Statistics review: probability, estimation	1
2	hypothesis testing	
2-3	Linear Regression Model	2, 4
3-4	Properties of OLS Estimators	3
5	Inference with OLS Estimators	3
6-7	Model Selection, Transformations	5, 7
8	Dummy Variables	6
9-10	Heteroscedasticity	8
11	Distributed Lag Models	12
12-13	Serial Correlation	13
13-14	Qualitative and Limited Dependent Variables	11