

Economics 470
Introduction to Econometrics
Course Syllabus for Fall 2020

Course Time

- Section 1: Tuesdays and Thursdays, 09h45am-11h00am.
- Section 2: Tuesdays and Thursdays, 11h30am-12h45pm.
- Online, see Sakai for Zoom instructions.

Instructor

Valentin Verdier

Office Hour: Tuesdays, 2h00pm-3h30pm. Online, see Sakai for Zoom instructions.

Course Website: Sakai

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Teaching Assistant

Martin Braun

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Office Hour: Fridays, 9h00am-10h30am. Online, see Sakai for Zoom instructions.

Textbook (Required)

Introductory Econometrics, edition 4, 5, or 6, Jeffrey Wooldridge, Thomson SouthWestern 2009 or 2012 or 2015. This is an expensive but excellent textbook. You can buy a used 4th edition book for not too much money. (Used 5th edition in paperback: \$14.56 on Amazon.)

Course Objectives

Econometrics is the name of the quantitative methods used to answer questions originated from economic theory using economic data that document the behavior of economic agents or the history of objects of interest to economists (GDP, stock prices,...). Econometrics has generated a huge amount of research over the last decades, hence it is not possible to cover the entire field (or even

a significant portion of it) in a semester. However, one of the goals of this course is to equip students with enough knowledge so that they can answer in a simple but informative way empirical questions they will face in professional or academic settings.

The other objective of this course is to lay the foundations for further training in econometrics, either at your future job or in more advanced courses.

Thus this course will try to balance theory and applications. Both of these are complementary and **require a lot of practice**. This is a technical course, and the key to success is to read the textbook to fully grasp the material and to practice as much as possible using the problem sets and the exercises at the end of the chapters.

The most important objective of this course is to teach a new approach to data analysis. Econometric analysis relies on linking a story about the real world (a model) to a particular method for using the data at hand to learn about objects of interest. We need to learn how to establish this kind mapping formally, **which means writing mathematical proofs**. Several students have never worked on a formal proof before this course and we will develop the tools needed together, but again lots of practice and making sure that you are on top of the material throughout the semester is key for success. When confronted to a particular empirical application in this course, being able to describe precisely the assumptions that justify a particular method and refer precisely to the properties of the methods used under these assumptions will be just as important as the practical implementation of these methods in Stata.

Course Requirements

There will be five or six problem sets. There will also be two midterm exams and a final exam. All exams will be in-class and closed book.

Dates for the exams will be announced during lecture as they will depend on how much time is spent on the Math and Stats review. The first midterm will occur soon after the review on mathematics and statistics is over. The second midterm will occur as soon as Part 1 of the syllabus is over. The final exam will take place during the time slot allocated by the registrar's office.

The grades will be weighted as following:

17.5% Problem sets

17.5% First midterm

32.5% Second midterm

32.5% Final

The final grade will be determined by the following table:

Final Grade	From	To
4.0	93.00%	100%
3.7	90.00%	92.99%
3.3	84.92%	89.99%
3.0	81.67%	84.91%
2.7	78.42%	81.66%
2.3	74.08%	78.41%
2.0	70.83%	74.07%
1.7	67.58%	70.82%
1.3	63.25%	67.57%
1.0	60.00%	63.24%
0.0	0.00%	59.99%

Prerequisites

Econ 410 and 400, with a grade of C or better in each.

Academic Integrity

This course will be consistent with university policies, see <https://studentconduct.unc.edu>.

Notes on online teaching

Due to covid-19, this course will be taught online this semester. I am expecting to meet the same learning objectives as when teaching this course in person, but to do so I am planning on a few adjustments compared to teaching this course in person.

Firstly, attending and participating in every lecture through Zoom will be very important in order to do well in this course. This means that students will need: A reliable internet connection, a quiet environment, a device which enables audio and video for Zoom meetings (tablet or computer are strongly preferred over a phone since there will be multiple screens simultaneously), and a webcam and microphone in order to intervene on Zoom during lecture. **If you have difficulties meeting these requirements, please contact me via email.**

Secondly, I will be posting typed notes ahead of each lecture on Sakai, while when teaching in person I rely on students taking their own notes. I have decided to make typed notes available this semester since taking notes when also following lecture on Zoom can be challenging, and students should not be penalized in case of temporarily spotty connections or other technical issues.

That being said, students should not rely on these notes only without attending lecture, attending lecture is essential for students to do well in this course.

Finally, problem sets will be turned in and graded online using Gradescope, for which instructions will be provided on Sakai. Students will need a scanner or a camera with high enough resolution (e.g., modern smartphone) in order to turn their problem sets in. **If you have difficulties meeting these requirements, please contact me via email.** Exams will be proctored online and instructions will be discussed both on Sakai and during lecture prior to exams taking place.

Additional notes

Please feel free to contact me with any question or concern you might have.

Students who require accommodation for a disability should contact me as soon as possible to set up arrangements.

Course outline and Reading List

Introduction

Chapter 1

Mathematics and Statistics review

Appendices A, B and C

Part 1: Econometrics with cross-sectional data

Simple regression

Chapter 2

Multiple regression: Estimation

Chapter 3

Multiple regression: Inference

Chapter 4

Part 2: Econometrics with panel data

Pooling cross sections across time

13.1, 13.2

Simple solutions to unobserved heterogeneity

13.3, 13.4, 13.5

Accounting for time-varying aggregate shocks

Part 3: Additional topics on multiple regression (if time permits)

6.1, 6.2, 6.4, 7.1, 7.2, 7.3, 7.4, 7.6

Part 4: Asymptotic Theory and Inference (if time permits)

Weak laws of large numbers and central limit theorems

Inference without normality in regression analysis

5.1, 5.2

Inference with heteroscedasticity

8.1, 8.2

Inference without random sampling

1. Panel Data

2. Time Series