Introduction to Econometrics [EC320]

Spring 2023 Syllabus

Andrew Dickinson, University of Oregon

Basics

	Lecture	**Lab**	
`when`	Mo. & We. 2:00p–3:20p	See below	
`where`	Knight Library 101	See below	
`who`	**Andrew Dickinson**	**Ethan Holdahl**	
	adickin3@uoregon.edu	eholdahl@uoregon.edu	(Use "`EC 320`" in email subject.)
	ajdickinson.github.io	ethanholdahl.com	
`office hours`	TBA	TBA	(Or by appointment)
`materials`	1. Introduction to Econometrics, 5th ed.		
	2. Mastering 'Metrics		

Course summary

This course introduces statistical techniques that economists use to test economic theories and to estimate the relationships between economic variables. Econometrics combines economics, mathematics, and statistics with data to analyze and measure economic phenomena. In this class, we will focus our attention on regression analysis–the workhorse of applied econometrics. Using calculus and introductory statistics, we will cultivate a working understanding of the theory underpinning regression analysis, emphasizing the assumptions we must make to make causal statements. Statistical programming is fundamental to practicing applied econometrics. Thus we will teach the statistical programming language R to apply insights from theory and learn how to work with data. To the extent that you invest the requisite time and effort, you can leave this course with marketable skills in data analysis and—most importantly—a more sophisticated understanding of the notion that *correlation does not necessarily imply causation*.

Prerequisites:

Math 242 (Calculus) and Math 243 (Introduction to Statistics) or equivalent.

Software

- We will use the statistical programming language **R**.
- We will use **RStudio** to interact with R.

Learning R is challenging, but well worth the effort. R is a powerful and versatile tool for data analysis and visualization, which makes it popular among employers. If you dedicate the time and effort necessary to learn the language, you are likely to reap a handsome return on the job market. I expect that you install R and RStudio on your own computer. Don't worry, both are free. I also recommend that you be thoughtful of how you choose to organize your saved scripts, data, and assignments (eg Home > Documents > Classes > EC320). I will be making material available through Github for convenience.

Recommendations

Labs, homework, and exams

Lab

In your weekly *synchronous* Wednesday lab section, you will learn to apply the concepts discussed in lecture using **R**. The main focus is on the practical application of statistical techniques and computational components of the bi-weekly problem sets. Attending lab is *crucial* for learning the material and passing the course. Everyone will have the option of either attending the *synchronous* session online **or** watching the *asynchronous* recordings that will be posted on the course Canvas page after every session.

Problem sets

- Problem sets will be **submitted online via Canvas**. Each problem set will include an analytical and a computational component. Only `html` and `pdf` will be accepted.
- Assignments will be due *approximately* every 1-2 weeks.
- Submissions **must be your own work**. You will receive **zero points** for copied work.
- Presentation matters.

Feel free to work together on the assignments. Unless explicitly stated, **each student is required to write and submit independent answers**. This means that word-for-word copies will not be accepted and will be viewed as academic dishonesty. In other words: You must place answers **in your own words and code**. Copying from other people (even if you worked with them) or from previous assignments is considered cheating.

Late policy

- I will accept assignments **up to 48 hours late** with a penalty of **2 percentage points per hour late**
- For example, when submitted 10 hours late, an assignment with a 90% score would be penalized by 20%, and the resulting final grade would be a 70%

Exams

- The **midterm** will likely take place on **XXX XX, 2023, 2:00-3:20**
- The *final exam **will be on** XXX XX, 2023, X:XX-X:XX**

There will be no option to take an exam early. Please bring your calculator and ID for the exams.

Grades

Grades for this class will be assigned based on the following assignments: (approximately) biweekly homework assignments, one midterm exam, one final exam. Final grades will be determined based on your rank-ordered position within the class (i.e., the course is curved)[1]. The weights for the final grade:

Problem Sets	30%
Midterm Exam	30%
Final Exam	40%

[1]The economics department has a uniform grading standard. In 300 and 400 level classes, roughly 65% of the class will receive A's and B's. I will not be able to tell you what your exact letter grade is at any point in time, because it depends on the scores of everyone else at the end of the course, but I will be able to give an assessment of your relative standing.

Textbooks and other readings

Econometrics books: There is one required and one recommended textbook for this course:

1. Introduction to Econometrics, 5th ed. by Christopher Dougherty (**ItE**), *required*
2. Mastering 'Metrics: The Path from Cause to Effect by Angrist and Pischke (**MM**), *optional (though required for 421)*

You can purchase them at the UO duckstore or your preferred online bookseller. I recommend that you read the assigned readings from the textbooks *before* lecture. The lectures and the readings are meant to *complement* one another. The tentative course schedule (below) lists the assigned readings for each topic.

R books: For learning R, a classic is Garrett Grolemund and Hadley Wickham's R for Data Science. If you have previous experience coding in R, you may want to check out Hadley Wickham's Advanced R.

Academic integrity

I will not tolerate cheating, plagiarism, and other violations of the Student Conduct Code. If you are caught cheating or plagiarizing on any component of this course, you will receive a failing grade for the term and I will report your offense to the university.

Accommodations

Notify me if there are aspects of this course that pose disability-related barriers to your participation. If you require special accommodations for a documented disability, then you will need to provide me a letter from the Accessible Education Center (AEC) that verifies your need and details the appropriate accommodations. Please make arrangements with the AEC by the end of Week 1. If your accommodations include exam proctoring at the AEC, then you are responsible for scheduling those exams with the AEC *at least seven days in advance*.

Etiquette

Please respect those around you by turning off your phone and other potentially distracting devices. I ask that you stay for the entire lecture: getting up and leaving distracts your fellow classmates. If you must leave early, please position yourself near the door when you get to class.

Makeup assignments

I do not give makeup assignments. In extreme circumstances that lead you to miss one of the midterm exams—such as death in the family or grave illness or injury—I will consider re-weighting your grade toward the final. To qualify for re-weighting, you will need to notify me no later than two days after the exam.

Tentative schedule

Week	Date	Topic	Reading
01	01/03	Introduction	
01	01/05	Statistics Review I	ItE Review
02	01/10	Statistics Review II	ItE Review; MM 1 (appendix)
02	01/12	The Fundamental Econometric Problem	MM 1
03	01/19	The Logic of Regression	MM 2
04	01/24	Simple Linear Regression: Estimation I	ItE 1
04	01/26	Simple Linear Regression: Estimation II	ItE 1
05	01/31	Classical Assumptions	ItE 2
05	02/02	Simple Linear Regression: Inference	ItE 2
06	02/07	Midterm Review	
06	02/09	**Midterm Exam (in-class)**	
07	02/14	Multiple Linear Regression: Estimation	ItE 3, 6.2; MM 2 (appendix)
07	02/16	Multiple Linear Regression: Inference	ItE 3, 6.3; MM 2 (appendix)
08	02/21	Nonlinear Relationships	ItE 4
08	02/23	Qualitative Variables	ItE 5
09	02/28	Interactive Relationships	ItE 4
09	03/02	Model Specification	ItE 6
10	03/07	Heteroskedasticity	ItE 7
10	03/09	Final Review	
11	03/16	**Final Exam, 14:45** (see final exam schedule)	