

Economics 381-1

Econometrics

Winter 2022

Instructor

Frank Limbrock

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Lectures: Mon, Wed 2:00 pm -3:20 pm, TECH M345 (On Zoom for first 2 weeks, links on Canvas)

Office hours: Fri, 4:30-6:00 pm

Teaching Assistant

Matthew O'Keefe, MatthewOKeefe2023@u.northwestern.edu

TA sections: Fri 2:00-3:20 pm, TECH M345 (On Zoom for first 2 weeks, links on Canvas)

Office hours: TBA

Course Description

Most of economics is concerned with understanding relations among variables. Examples include the effects of education on earnings, the relation between the lengths of prison sentences and crime rates, and the relation between interest and inflation rates. Econometrics provides the statistical tools needed to infer these relations from data and test theory models of the relations. Thus, econometrics is the toolbox of empirical economics. This course covers the basic methods of empirical economics and provides tools that are needed to build and critically evaluate empirical econometric models. Topics will include the linear regression model, limited dependent variable models and causal inference.

Mode of Instruction

The current planning is to have remote instruction via zoom for the first 2 weeks, in person-instruction for the rest of the quarter.

For the zoom portion of the course: Students are strongly encouraged to attend classes live, at the times given above. However, students who cannot attend classes live (e. g. due to time zone or internet connectivity issues) will get access to video recordings:

“This class or portions of this class will be recorded by the instructor for educational purposes. These recordings will be shared only with students enrolled in the course and will be deleted at the end of the Winter Quarter, 2022. Your instructor will communicate how you can access the recordings.

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact [AccessibleNU](#). Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University's [Copyright Policy](#), faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display, or distribute these materials. Students who

engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.”

Prerequisites

See <https://www.economics.northwestern.edu/undergraduate/student-services/course-curriculum-faqs.html>

Grading

Grading is based on the midterm exam (40%) and the cumulative final exam (50%). The midterm (75 minutes) will be on **February 7** at our usual class time. The final exam (120 minutes) will be on **March 18** at 3:00 pm.

You will also be required to complete 6 problem sets (10%) throughout the quarter, of which the best 5 will count towards your final grade (i. e. we will drop your lowest score). You are welcome to work in groups, but each student must write up his or her answers separately. The problem sets will be posted on Crowdmark and are **due at 12:00 noon on the following dates: Jan 14, Jan 21, Jan 28, Feb 18, Feb 25, Mar 4.**

Stata and other Statistical Software

Stata is an econometric software package we will use this quarter and is available on most campus computers (see <https://www.library.northwestern.edu/visit/technology/computers/index.html> for locations). Stata is also available for purchase to students at discounted prices, see <https://www.stata.com/order/new/edu/gradplans/student-pricing/> .

Finally, students can apply for an NUworkspace account to use Stata from anywhere (<https://nuworkspace.northwestern.edu/> , limited capacity).

Students also have the option of using different statistical software such as R or Python instead of Stata for the empirical problem set questions

Readings and Textbook

The textbook for this class is “Introduction to Econometrics” by Stock and Watson, 4th edition. The 3rd (updated) edition will also work. The relevant chapters for each class are indicated below. All other course material will be posted on Canvas.

Academic or athletic accommodation

Any student with a verified disability requiring special accommodations should speak to me, in office hours or via email, and to the Office of Services for Students with Disabilities (847-467-5530) as early as possible in the quarter, ideally in the first week, to arrange appropriate accommodation. Students on Northwestern varsity athletic teams who anticipate an exam conflict due to an NCAA event should work with Margaret Akerstrom (m-akerstrom@northwestern.edu) in Academic Services and ask her to contact me on your behalf. All discussions with me, with the Office of Services for Students with Disabilities and with Academic Services will remain confidential.

Course Outline

Class	Date	Topic	S&W chapters
1	1/3/2022	Probability and Statistics Review	2,3
2	1/5/2022	Probability and Statistics Review	2,3
3	1/10/2022	Regression Analysis with One Variable	4,5,18 (17 in 3 rd ed)
4	1/12/2022	Regression Analysis with One Variable	4,5,18 (17 in 3 rd ed)
5	1/19/2022	Regression Analysis with One Variable	4,5,18 (17 in 3 rd ed)
6	1/24/2022	Regression Analysis with One Variable	4,5,18 (17 in 3 rd ed)
7	1/26/2022	Regression Analysis with Multiple Variables	6,7,19 (18 in 3 rd ed)
8	1/31/2022	Regression Analysis with Multiple Variables	6,7, 19 (18 in 3 rd ed)
9	2/2/2022	Regression Analysis with Multiple Variables	6,7, 19 (18 in 3 rd ed)
10	2/7/2022	MIDTERM	
11	2/9/2022	Regression Analysis with Multiple Variables	6,7, 19 (18 in 3 rd ed)
12	2/14/2022	Regression Analysis with Multiple Variables	6,7, 19 (18 in 3 rd ed)
13	2/16/2022	Nonlinear Regression Functions	8
14	2/21/2022	Assessing Regression Studies; Introduction to Causal Inference	9
15	2/23/2022	Panel Data	10
16	2/28/2022	Instrumental Variable Estimation	12
17	3/2/2022	Experiments and quasi-Experiments	13
18	3/7/2022	Estimation with Binary Dependent Variables	11
	3/18/2022	FINAL EXAM	