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Economics 381-1
Econometrics
Winter 2021

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Instructor
Frank Limbrock
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Lectures: Mon, Wed 2:00 pm -3:20 pm, via Zoom
Office hours: Fri 3:30-5:00 pm or by appointment

Teaching Assistant
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TA sections: Fri 2:00-3:20 pm, via Zoom
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
All lectures and discussion sections will be exclusively taught online via zoom.

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 end of the Spring Quarter, 2020 course. 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 (90 minutes) will be due on **February 19** at 1:00pm. The final exam (120 minutes) will be due on **March 16** at 5:00 pm. Both these exams will be made available on Crowdmark 24 hours before the due date/time to accommodate class conflicts and students in different time zones.

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 22, Jan 29, Feb 5, Feb 12, Feb 26, Mar 5.**

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-akerstom@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	1/11/2021	**Probability and Statistics Review**	2,3
2	1/13/2021	**Probability and Statistics Review**	2,3
3	1/20/2021	**Regression Analysis with One Variable**	4,5,18 (17 in 3rd ed)
4	1/25/2021	**Regression Analysis with One Variable**	4,5,18 (17 in 3rd ed)
5	1/27/2021	**Regression Analysis with One Variable**	4,5,18 (17 in 3rd ed)
6	2/1/2021	**Regression Analysis with One Variable**	4,5,18 (17 in 3rd ed)
7	2/3/2021	**Regression Analysis with Multiple Variables**	6,7,19 (18 in 3rd ed)
8	2/8/2021	**Regression Analysis with Multiple Variables**	6,7, 19 (18 in 3rd ed)
9	2/10/2021	**Regression Analysis with Multiple Variables**	6,7, 19 (18 in 3rd ed)
10	2/15/2021	**Regression Analysis with Multiple Variables**	6,7, 19 (18 in 3rd ed)
11	2/17/2021	**Regression Analysis with Multiple Variables**	6,7, 19 (18 in 3rd ed)
12	2/22/2021	**Nonlinear Regression Functions**	8
13	2/24/2021	**Assessing Regression Studies; Introduction to Causal Inference**	9
14	3/1/2021	**Panel Data**	10
15	3/3/2021	**Instrumental Variable Estimation**	12
16	3/8/2021	**Experiments and quasi-Experiments**	13
17	3/10/2021	**Estimation with Binary Dependent Variables**	11
	3/16/2021	**FINAL EXAM**	