**Economics 381-1**
Econometrics
Winter 2020

**Instructor**
Frank Limbrock
KGH 3495
847 491 8678
f-limbrock@kellogg.northwestern.edu
*Lectures:* Mon, Wed 2:00 pm -3:20 pm, University Hall 122
*Office hours:* Fri 3:00-3:50 pm or by appointment

**Teaching Assistant**
Modibo Camara, modibocamara2021@u.northwestern.edu
*TA sections*: Fri 2:00-2:50 pm, Annenberg G15
*Office hours*: Thu 3:00-5:00, KGH 3496

**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.

**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 10**, during our normal meeting time. The final exam will be on **March 20**, 3:00pm- 5:00 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 Canvas and are **due at 12:00 noon in Modibo Camara's mailbox in KGH 3317 (Economics Department Main Office) on the following dates: Jan 17, Jan 24, Jan 31, Feb 21, Feb 28, Mar 6.**

**Stata**
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).

**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.

**Electronic Device Policy**
Use of electronic devices in class is only permitted for the purposes of taking notes and following along with examples in Stata.

**<u>Course Outline</u>**

| Class | Date | Topic | S&W chapters |
|---|---|---|---|
| 1 | 1/6/2020 | **Probability and Statistics Review** | 2,3 |
| 2 | 1/8/2020 | **Probability and Statistics Review** | 2,3 |
| 3 | 1/13/2020 | **Regression Analysis with One Variable** | 4,5,18 (17 in 3rd ed) |
| 4 | 1/15/2020 | **Regression Analysis with One Variable** | 4,5,18 (17 in 3rd ed) |
| 5 | 1/22/2020 | **Regression Analysis with One Variable** | 4,5,18 (17 in 3rd ed) |
| 6 | 1/27/2020 | **Regression Analysis with One Variable** | 4,5,18 (17 in 3rd ed) |
| 7 | 1/29/2020 | **Regression Analysis with Multiple Variables** | 6,7,19 (18 in 3rd ed) |
| 8 | 2/3/2020 | **Regression Analysis with Multiple Variables** | 6,7, 19 (18 in 3rd ed) |
| 9 | 2/5/2020 | **Regression Analysis with Multiple Variables** | 6,7, 19 (18 in 3rd ed) |
| 10 | 2/10/2020 | **MIDTERM** | |
| 11 | 2/12/2020 | **Regression Analysis with Multiple Variables** | 6,7, 19 (18 in 3rd ed) |
| 12 | 2/17/2020 | **Regression Analysis with Multiple Variables** | 6,7, 19 (18 in 3rd ed) |
| 13 | 2/19/2020 | **Nonlinear Regression Functions** | 8 |
| 14 | 2/24/2020 | **Assessing Regression Studies; Introduction to Causal Inference** | 9 |
| 15 | 2/26/2020 | **Panel Data** | 10 |
| 16 | 3/2/2020 | **Instrumental Variable Estimation** | 12 |
| 17 | 3/4/2020 | **Experiments and quasi-Experiments** | 13 |
| 18 | 3/9/2020 | **Estimation with Binary Dependent Variables** | 11 |
| | 3/20/2020 | **FINAL EXAM** | |