

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

ECONOMICS

ECON UN3412

Spring 2025, section 2

Introduction to Econometrics

Lecturer: Michael Carlos Best, michael.best@columbia.edu

Class meetings: Mondays and Wednesdays 11:40 AM – 12:55 PM. Location: 517 Hamilton Hall.

Office hours: Thursdays 2 – 3 PM. IAB 1112.

Required Textbooks:

1. Stock, James H. and Watson, Mark W. *Introduction to Econometrics*, 4th ed. Pearson 2019. (3rd ed is very different, it's much better if you have the 4th edition)
2. Angrist, Joshua and Pischke, Jörn-Steffen. *Mastering 'Metrics: The Path from Cause to Effect*, Princeton University Press 2014.

Recommended Textbooks:

Wooldridge, Jeffrey M. *Introductory Econometrics: A Modern Approach*, (7th edition) Cengage Learning, 2020.

TEACHING ASSISTANTS:

The Teaching Assistants for this section are

1. Marina Lemos (mdl2178@columbia.edu)
2. Dafne Murillo (dm3160@columbia.edu)
3. Pablo Torres (pt2582@columbia.edu)

The Teaching Assistants for section 3 are

1. Tara Kuruvila (tk3039@columbia.edu)
2. Arslan Ali (aza2115@columbia.edu)
3. Zaheer Abbas (za2305@columbia.edu)

TAs will hold regular recitations and office hours. Time and location are TBD and will be posted on the Courseworks Home Page. You are required to sign up for UN3413 INTRO TO ECONOMETRICS-DIS. It is recommended to take recitations from the TAs in this section. However, you may choose TAs from section 3 (but not section 1) if it suits your schedule better.

COURSE DESCRIPTION:

Economics UN3412 introduces students to multiple regression and related methods for analyzing data in economics and related disciplines. Additional topics include regression with discrete random variables, instrumental variables regression, analysis of random experiments and quasi-experiments. Students will learn how to conduct – and how to critique – empirical studies in economics and related fields. Accordingly, the emphasis of the course is on empirical applications. The mathematics of econometrics will be introduced only as needed and will not be a central focus. Students seeking a treatment of econometric theory with a

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higher level of mathematics should take Economics W4412. Prerequisites: Economics UN3211 OR UN3213 (Intermediate Microeconomics or Macroeconomics); Statistics 1201 (Calculus-based Introduction to Statistics).

ASSIGNMENTS:

There will be eight problem sets for the class, each of which involves empirical analysis. You have a choice of which software to use for your problem sets.

1. STATA. You may [purchase STATA](#) at a reduced academic price but this is strictly optional. Stata/BE (Basic Edition) is sufficient for this course.

If you are interested in pursuing the least expensive personal acquisition option, it is to license (rent) the software for 6 months. Start the ordering process at stata.com, then “Purchase” along the top, then “View Pricing.” Categorize yourself as a “Student”, not “Education” which is for faculty and staff so would be more expensive. Opt for the “6-months” license, not the default “Annual.” As of January 2025 the 6-month cost for students is \$48. In the checkout process you will be asked for your status, “Student,” and your affiliation, “Columbia University.” Further into the checkout process, you may be asked for your email address. It is best to use your Columbia email address. If you are asked for a student ID, supply your UNI email address, NOT your social security number. It would be helpful if you let your instructor know if you experience anything different than described in order for the instructor to provide the information to other students.

If you prefer not to buy the license, there are computer labs on campus with Stata, the closest one is in Lehman Library (the Digital Social Science Center). CUIT has also set up remote access to library computers. You can see the instructions here: <https://cuit.columbia.edu/computer-lab-technologies>. There are quite a few steps so make sure to set this up well in advance of your problem set deadlines!

2. R. R is open source, and hence free! Many research economists still use STATA but R is growing very fast. Most data scientists in industry use either R or Python. Using R involves downloading and installing R itself. It also typically requires a user interface to make it easier to interact with. The best one is R Studio. Instructions to set it all up are here: <https://rstudio-education.github.io/hopr/starting.html>

An alternative to downloading the software is to use R in the cloud at <https://posit.cloud>. As of January 2025, the free version provides 25 “compute hours” per month which is likely to be sufficient. The next step up is the \$5 per month student version which provides 75 hours per month.

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If you know other programming languages (e.g. Python, Matlab) you will probably find R a bit easier to learn. If you haven't done very much programming before, you will probably find STATA easier to learn.

Problem sets and data will be posted on Courseworks. Please hand in your homework assignments at the time (or before) they are due through Gradescope. You will need to sign up to Gradescope ahead of time. *There is a document posted that explains how to submit homework to Gradescope, please read this document ahead of time so that you do not miss the due date due to technical difficulties.*

Problem sets that are submitted after the time they are due but before solutions are posted will receive 50% credit. Assignments handed in after solutions are posted on Courseworks will not be graded.

Students may work on solving problems together and/or writing code together, but each student **MUST** write up his or her answers **SEPARATELY**. If there is collaboration, each student should list the names of the collaborators near their own name on their submission. Students may not submit any component that is an electronic copy of another student's work. Any finding of submitting an electronic copy of a portion of another student's work, including supporting code, will result in the score for the *entire problem set* being split among the students with the common portion. The goal is that students that do not understand the material particularly well at least get the experience of creating *all* of their own submission. – and that students working together acknowledge one another.

DO NOT POST, EMAIL, OR OTHERWISE GIVE AWAY AN ELECTRONIC VERSION OF YOUR SOLUTIONS! Occasionally a hard-working student's solutions become widely distributed and they receive virtually no credit for producing them. Students should also be aware that some of the exam questions may be similar to problem set questions, so it is to their own benefit to solve the problem set questions themselves.

Use of AI. Using ChatGPT, Copilot or other AI aids to help with problem sets is not prohibited. Consider AI as a resource much like any other reference that may be used. Two points to consider:

First, if you use AI to aid with your problem set, you need to cite it. In other words, you must mention in your problem set which parts were co-written or aided using AI. AI has a tendency to make errors. The code snippets often do not accomplish the goal. The student is responsible for making sure that the submitted answers are correct and complete.

Second, during the exams students will not have access to AI tools. Students still need to master the material themselves.

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GRADING:

Teaching assistants will grade problem sets and your lowest grade out of the six problem sets will be dropped. We will calculate your average problem set grade by averaging the five highest problem set grades. Let this number be PS .

There will be one midterm exam, which will take place on **Wednesday March 12th 11:40AM - 12:55 PM**. You will receive a grade out of 100 (denote this grade MT). There will be **no make-up midterm** exams, but the midterm will be given less weight if you do better in the final. The final exam will take place on **Monday May 12th 9:00AM – 12:00PM**. You will receive a grade out of 100 (call it FI).

The overall course grade (CG) will be determined as:

$$CG = 0.3 * PS + 0.3 * \min\{MT, FI\} + 0.4 * \max\{MT, FI\}$$

If you have any questions for me or for TAs, please ask them through **Ed Discussions**. This way your classmates can see our answers as well. The system is highly effective at getting you help fast and efficiently from TAs and myself. Rather than emailing us questions, I strongly encourage you to post your questions on Ed Discussions. You can find our class page at [this link](#) (you can also access it through Courseworks) *Please be respectful in your tone at all times when communicating with each other, the TAs or instructors, whether on Ed Discussions, by email, or in person.* Disrespectful language will not be tolerated.

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CLASS SCHEDULE:

#	Date	Day	Topic	Readings		Problem Sets	
				SW	AP	Posted	Due
1	Jan	22	W	Introduction, Experiments and Statistics I	1, 2, 3, 13.1-2	1	
2		27	M	Experiments and Statistics II	1, 2, 3, 13.1-2	1	
3		29	W	Experiments and Statistics III	1, 2, 3, 13.1-2	1	PS 1
4	Feb	3	M	Bivariate regression I	4, 5	2	
5		5	W	Bivariate regression II	4, 5	2	
6		10	M	Bivariate regression III	4, 5	2	PS 2 PS 1
7		12	W	Multiple regression I	6, 7	2	
8		17	M	Multiple regression II	6, 7	2	
9		19	W	Multiple regression III	7	2	PS 3 PS 2
10		24	M	Nonlinear models I	8		
11		26	W	Nonlinear models II	8		
12	Mar	3	M	Assessing regression studies	9		PS 3
13		5	W	Assessing regression studies II	9		
14		10	M	Midterm Exam Review			
	Mar	12	W	Midterm Exam SW chapters 1-9 & AP chs 1-2			
		17	M				
		19	W	Spring Break			
15		24	M	Binary dependent variables I	11		PS 4
16		26	W	Binary dependent variables II	11		
17		31	M	Prediction with many regressors, Big data	14		
18	Apr	2	W	Instrumental variable regression I	12	3	
19		7	M	Instrumental variable regression II	12	3	PS 5 PS 4
20		9	W	Instrumental variable regression III	12	3	
21		14	M	Regression discontinuities I		4	
22		16	W	Regression discontinuities II		4	
23		21	M	Panel data I	10		PS 6 PS 5
24		23	W	Panel data II and Difference in differences I	10, 13	5	
25		28	M	Difference in differences II	13	5	
26		30	W	Difference in differences III	13	5	PS 6
27	May	5	M	Final Exam Review			
	May 12 9AM - 12PM			Final Exam SW chapters 10-14 & AP chs 3-5			