
Columbia Business School
Modern Econometrics for Business (B8257)
Course Syllabus
Spring 2018

Course Description

Data analysis in economics, or “econometrics” as it is called by practitioners, has moved away from mathematical complexity and towards simpler tools that are accessible to businesses and can be applied easily to big data. This course will provide students with an understanding of three widely used techniques in modern econometrics: randomized control trials, regression discontinuity, and differences-in-differences. After learning how these tools provide superior analytic results than traditional regression techniques in making inferences about the real world, students will gain the practical knowledge to wield them successfully and make better decisions with data.



Course Instructor

Professor Jonah Rockoff
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Office Hours: TBA

Class Locations and Schedule

Warren Hall Room 310. Tuesdays and Thursdays, 4:00-5:30pm.

Course Materials

Readings: There is no required textbook for this course, but short readings from various sources, including textbooks, will be posted on Canvas and some readings are required. We will discuss two case studies, and these will be made available via Canvas.

- For those who would like to have a textbook on hand, two excellent books covering the course material are: Gerber and Green’s “Field Experiments: Design, Analysis, and Interpretation” and Angrist and Pischke’s “Mastering ‘Metrics.’” These can be relied on to help with questions about homework, additional study material, etc.

Handouts: At the start of each session, students will be provided with a handout which accompanies slide presentations. Handouts do not contain all presented material, and students will find it useful to bring a notebook on which to take notes. Copies of handouts, presentations, and any other relevant materials from class will be posted on Canvas after class.

Course Evaluation

Grade determinants and their relative weights are as follows:

Class Participation (25%): In-class discussions are an integral part of the course, and students are expected to contribute to the learning experience of the class by asking relevant questions, offering insights into the topic at hand, and generally behaving in a professional manner. Quality of contribution matters more than quantity.

Class participation scores will also take into account attendance, lateness, and completion of pre-class (Canvas) and in-class (clicker) surveys. Students are expected to attend each class session. Absences from class are only appropriate in cases of illness, personal or family emergency, military service, court appearance or religious observance. Approved absences are granted only by Student Affairs (osa@gsb.columbia.edu), who will then contact faculty on a student's behalf.

Short Essay (5%): You will be asked to write one short essay (one page single spaced) that provides a qualitative, critical analysis of an observational study.

Problem Sets (30%): There will be three problem sets for the course, the first two covering experimental methods and the third covering analysis of natural experiments. Problem sets are Type B2 (see table below). They must be **written up and turned in individually**. Students can discuss concepts related to the problems, but not their own individual submissions or solutions, with members of their learning team and/or other classmates.

Type	Designation	Grade	Preparation of submission	Discussion of Submission	Discussion of Concepts
B2	Individual with discussion of concepts only	Individual grade	Individual preparation	Not permitted to share/discuss solutions or submission	Permitted

Problem sets are to be submitted as a single PDF file via Canvas. Please name PDF files using the following convention: "Metrics_PS#_FIRSTNAME_LASTNAME.pdf" where # is the problem set number (1 to 3) and FIRSTNAME/LASTNAME are filled in with your name.

Submissions are scored and returned via Canvas. Partial credit is given for problem sets turned in within 8 hours of the normal deadline in the following manner (determined by time-stamp for upload to Canvas): 20% reduction for *any* lateness, plus a reduction of 10% per hour, giving partial credit to any assignment turned in before 8:00AM the next day. (E.g., the score for an assignment turned in at 2:30AM would be reduced by $20\% + 25\% = 45\%$.) At 8:00AM the following day, solutions will be made available on Canvas, and no more assignments will be accepted. Students are encouraged to turn in problem sets prior to the due date.

Group Project (40%): For your final project, you will run your own experiments in small groups (of 3-5 people). You will first write a proposal (worth 10% of your grade) in which you pose a question and sketch an experiment to answer it. At the end of the course, you will submit a short report on the results of your experiment and will be expected to produce a 5-minute presentation for the class (30%).

Course Schedule and Outline

Session	Date		Topic	Sub-Topics	Readings
Module 1: Experimental Methods					
1	Tuesday	24-Jan	Why Experiment?	Data vs. Humans; Decisions vs. Predictions; Endogeneity/Causality	Run Field Experiments to Make Sense of Your Big Data; How to Design Smart Business Experiments; The Discipline of Business Experimentation
2	Thursday	26-Jan	Comparing Apples to Apples: Online Advertising at Facebook	Randomization; blocking; balance tests; statistical power	On the Near Impossibility of Measuring the Returns to Advertising; A Comparison of Approaches to Advertising Measurement: Evidence from Big Field Experiments at Facebook
3	Tuesday	31-Jan	Non-Compliance in Experiments: Online Advertising and Offline Sales	Measuring compliance; Treatment on the Treated; Heterogeneous Treatment Effects	People and Cookies: Imperfect Treatment Assignment in Online Experiments; Location, Location, Location: Repetition and Proximity Increase Advertising Effectiveness
4	Thursday	2-Feb	RestaurantGrades Case Study		HBS case: Advertising Experiments at RestaurantGrades
	Monday	6-Feb	<i>Problem Set #1 Due</i>		
5	Tuesday	7-Feb	Placebo and Hawthorne Effects: Improving Fuel Economy at Virgin Airlines	Information Experiments; Documenting Hawthorne Effects; Placebo Testing	HBR: Virgin Atlantic Tested 3 Ways to Change Employee Behavior; A New Approach to an Age-old Problem: Solving Externalities by Incenting Workers Directly
6	Thursday	9-Feb	Dealing with Attrition: Telecommuting at C Trip	Attrition Bias	A Working from Home Experiment Shows High Performers Like It Better; To Raise Productivity, Let More Employees Work from Home
Module 2: Natural Experiments					
7	Tuesday	14-Feb	Regression Discontinuity (RD)	Recognizing discontinuity; checking for continuity	
8	Thursday	16-Feb	RD Application I: Uber Pricing	Local vs. Average Effects	Using Big Data to Estimate Consumer Surplus: The Case of Uber
	Monday	20-Feb	<i>Problem Set #2 Due</i>		
9	Tuesday	21-Feb	RD Application II: Yelp Ratings	Manipulation of the Running Variable; Data Heaping	HBS Working Knowledge: The Yelp Factor: Are Consumer Reviews Good for Business?; Reviews, Reputation, and Revenue: The Case of Yelp.com
10	Thursday	23-Feb	Differences in Differences (D-D)	Control Group Selection; Parallel Trends Assumption	
11	Tuesday	28-Feb	D-D Application: eBay Best Offers	Inference with Clustering	Messaging on eBay's Best Offer Sales
12	Thursday	2-Mar	D-D Application: Ohio Toys Case / <i>Experiment Presentations</i>		Case: Advertising Experiments at the Ohio Toy Company
	Thursday	9-Mar	<i>Problem Set #3 Due</i>		
	Sunday	12-Mar	<i>Final Project Write-ups Due</i>		

Columbia Core Culture

The purpose of the Columbia Core Culture is to promote a consistent classroom environment of mutual respect, preparation and engagement. Our expectation of you in class is to be:

Present: Your success depends on being on time and present for the entire class every session. Attendance will be part of your grade for class participation.

Prepared: Bring your nameplate, clicker, and complete any pre-work needed for class discussion. Expect the professor to cold call in class.

Participating: Active participation calls for no electronic devices such as laptops, smartphones, or tablet computers during class, except if you are told to use them as part of in-class work.

Inclusion, Accommodations, and Support for Students

At Columbia Business School, we believe that diversity strengthens any community or business model and brings it greater success. Columbia Business School is committed to providing all students with the equal opportunity to thrive in the classroom by providing a learning, living, and working environment free from discrimination, harassment, and bias on the basis of gender, sexual orientation, race, ethnicity, socioeconomic status, or ability.

Columbia Business School will make reasonable accommodations for persons with documented disabilities. Students are encouraged to contact the Columbia University's Office of Disability Services for information about registration. Students seeking accommodation in the classroom may obtain information on the services offered by Columbia University's Office of Disability Services online at www.health.columbia.edu/docs/services/ods/index.html or by contacting (212) 854-2388.

Columbia Business School is committed to maintaining a safe environment for students, staff and faculty. Because of this commitment and because of federal and state regulations, we must advise you that if you tell any of your instructors about sexual harassment or gender-based misconduct involving a member of the campus community, your instructor is required to report this information to a Title IX Coordinator. They will treat this information as private, but will need to follow up with you and possibly look into the matter. Counseling and Psychological Services, the Office of the University Chaplain, and the Ombuds Office for Gender-Based Misconduct are confidential resources available for students, staff and faculty. "Gender-based misconduct" includes sexual assault, stalking, sexual harassment, dating violence, domestic violence, sexual exploitation, and gender-based harassment. For more information, see <http://sexualrespect.columbia.edu/gender-based-misconduct-policy-students>.