ECON 3516: Econometrics

Fall 2025

Bowdoin College

1 Course Information

Instructor: Weizheng Lai
Contact: By email w.lai@bowdoin.edu
Lecture Time: TuTh 2:50 PM–4:15 PM
Lecture Location: Searles Science Building 117
Office Hours: Tu 10:30–11:30 AM & 4:30–5:30 PM and Th 10:30–11:30 AM, Hubbard 8 (starting from 9/4); or by appointment
Course Website: Canvas

Communication: For all emails, please Place "ECON 3516" in the subject line. I will try to respond to emails within 24 hours. Lecture notes and announcements will be posted on the course website. It is your responsibility to check your email and Canvas regularly for updates and announcements.

Main Material/Textbook: The main material is lectures and lecture slides, which will be posted online. There are no required textbooks. The following references can be useful:

- *[JW]* Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 8th edition.
- *[AP]* Joshua D. Angrist and Jörn-Steffen Pischke, *Mastering 'Metrics: The Path from Cause to Effect*.

Software: Stata (available for download on your Bowdoin-issued laptop). You can find some resources for learning Stata on the course website. I will introduce some basic uses of the software in class. I am also more than happy to help you during office hours.

Course Description: This course introduces statistical tools for economic analysis. A central focus is on how to learn causal effects from observed data. We will discuss causal identification, linear regression techniques, and some commonly used causal inference tools. An empirical research paper is required.

2 Grading

The final grade is based upon

- Problem Set $\times$ 4 ($4 \times 5\% = 20\%$)

- Exam 1 (20%)
- Exam 2 (20%)
- Research paper (25%):
  - Proposal (5%)
  - Summary statistics (5%)
  - Final paper (15%)
- Research presentation (15%)

Problem Sets: They include both theoretical and empirical questions to help you get familiar with the material. Solutions will be provided after submission.

Exam 1: covers the material covered in the first half from 9/2–10/9. Practice exams will be provided.

Exam 2: covers the material covered in the second half from 10/16–11/13. Practice exams will be provided.

Research Paper: See the handout for requirements and grading rubrics. You will develop an empirical project to address an original research question. There are several interim deadlines for submission of different parts of the paper (idea approval, 1-page proposal, summary statistics, slides draft, etc.) to enable you to complete the paper on time.

- You *must* meet with me to discuss your idea by 10/21. Email me to schedule.
- A 1-page research proposal is due by 10/28. In your proposal, you should articulate your research question, data sources, and empirical methods.
- Summary statistics of your data are due by 11/11.
- Presentations start on 12/4. That said, you should have your results ready before that date.
- The final paper is due by 12/17.

In-Class Presentation: In the last two classes, you will present your research project to the class with slides. You should prepare to take questions from the audience. The presentation will be about 8 minutes (6 minutes talk + 2 minutes Q&A). It is a great opportunity to get feedback on your project before you complete writing and submit the paper. See the handout for requirements and grading rubrics. I will randomly assign you to a date for presentation.

Letter grades are assigned as follows.

Score Percentage	Grade	Notes
$[90, 100)$	A	
$[87, 90)$	A-	
$[82, 87)$	B+	
$[78, 82)$	B	
$[75, 79)$	B-	
$[?, 75)$	C- to C+	I will give some version of a C even for scores that dip into the 60 percent range.
$[?, ?)$	D	A score below 60 percent is likely to earn a D.
$[?, ?)$	F	An F will only be given in rare circumstances, such as failing multiple assignments or demonstrating no effort in the course.

3 Course Policies

Academic honesty. The relevant Honor Code clauses for this class include: "'Academic Dishonesty' includes but is not limited to (1) the receiving, giving, or using of any unauthorized assistance on quizzes, tests, written assignments, examinations or laboratory assignments;... (4) acquisition, without permission, of tests, computer files or similar material which would give the student an unfair advantage on an assignment or examination; (5) submission of academic work not a student's own original effort." More information can be found at: https://www.bowdoin.edu/dean-of-students/student-handbook/the-academic-honor-code-and-social-code.html.

Use of AI. You may use AI programs, e.g., ChatGPT, to help learn statistical software, generate ideas, and brainstorm. However, you should note that the material generated by these programs may be inaccurate, incomplete, or otherwise problematic. Beware that use may also stifle your own independent thinking and creativity. You may not submit any work generated by an AI program as your own. If you include material generated by an AI program, it should be cited like any other reference material (with due consideration for the quality of the reference, which may be poor). Any plagiarism or other form of cheating will be dealt with severely under Bowdoin's academic integrity policies. You are responsible for assessing the quality, completeness, and accuracy of the cited information.

Late submission, extension, and makeup policies. Assignments submitted late will lose 10% of the points per day. Extensions may be granted if you contact me in advance with compelling reasons and supporting evidence. No makeup exams will be given except in cases of illness (confirmed by a doctor's certificate), religious observance, participation in College activities at the request of the College authorities, or compelling circumstances beyond the student's control. If at all possible, the student must inform me (or the Economics Department) of her/his situation before the exam.

Getting your learning needs met. Bowdoin College and I are committed to ensuring access to learning opportunities for all students. Please connect with me about any learning or personal challenges that arise for you over the semester that are impacting your engagement and learning in this course. I will honor any requests to reschedule an assignment or miss class due to the observation of religious holidays.

Students seeking accommodations based on disabilities must register with the Student Accessibility Office. Please discuss any special needs or accommodations with me at the beginning of the semester or as soon as you become aware of your needs; I am eager to work with you to ensure that your approved accommodations are appropriately implemented. If you have questions about requesting accommodations or concerns about approved accommodations, please contact Lesley Levy (llevy@bowdoin.edu), director of student accessibility, or talk with me at any time.

The Baldwin Center for Learning and Teaching offers peer-to-peer resources including mentors, Q-Tutors, and Writing Assistants. If you are multilingual you may also take advantage of Lisa Flanagan to work on writing and speaking assignments and projects. Tina Chong is available as an Academic Coach to work with you on goal setting, managing time, study habits and other strategies to support academic success (link).

The Office of the Dean of Students is also a resource for students facing personal and academic challenges. I encourage you to reach out to the people in the dean's office for a meeting anytime.

Disclaimer. This syllabus is intended to give the student guidance in what may be covered during the semester and will be followed as closely as possible. I reserve the right to modify, supplement, and make changes as the course needs arise.

4 Schedule (Subject to Change)

Date	Lecture Topic	Reference	Notes
9/2	Introduction; Probability & Statistics I	JW Math Refresher B & C	PS1 assigned
9/4	Probability & Statistics II	JW Math Refresher B & C	
9/9	Probability & Statistics III; Data Type	JW Math Refresher B & C & Chapter 1	
9/11	Causality	AP Introduction & Chapter 1	
9/16	Bivariate Regression I	JW Chapter 2	**PS1 due**; PS2 assigned
9/18	Bivariate Regression II	JW Chapter 2	
9/23	Bivariate Regression III	JW Chapter 2	
9/25	Bivariate Regression IV	JW Chapter 2	
9/30	Multivariate Regression I	JW Chapter 3	**PS2 due**; PS3 assigned
10/2	Multivariate Regression II	JW Chapter 3	
10/7	Multivariate Regression III	JW Chapter 3	
10/9	Multivariate Regression IV	JW Chapter 3	
10/14	*No class. Fall break!*		
10/16	Statistical Inference I	JW Chapter 4	
10/18			**PS3 due**
10/21	Statistical Inference II	JW Chapter 4	
10/23	**Exam 1**		
10/28	Asymptotics	JW Chapter 5	**1-page proposal due**
10/30	Heteroskedasticity	JW Chapter 8	
11/4	Limited Dependent Variables	JW Chapter 7	
11/6	Specification and Data Issues	JW Chapter 9	PS4 assigned
11/11	Panel Data Methods I	JW Chapters 13 & 14; AP Chapter 5	**Summary statistics due**
11/13	Panel Data Methods II	JW Chapters 13 & 14; AP Chapter 5	
11/18	Instrumental Variable I	JW Chapter 15; AP Chapter 3	
11/20	Instrumental Variable II	JW Chapter 15; AP Chapter 3	**PS4 due**
11/25 & 11/27	*No class. Thanksgiving!*		
12/2	Regression Discontinuity (if time permits)	AP Chapter 4	
12/4	**Exam 2**		
12/9 & 12/11	Presentation of Project		**Final slides due;** you may send draft slides to me for advice at least 48 hours before your presentation
12/17			**Paper due**

All assignments are due by 11:59 PM on the assigned due dates.