THE UNIVERSITY OF UTAH

ECON 4650: PRINCIPLES OF ECONOMETRICS

SPRING 2025

In-person

Time: Tues/Thurs, 2 pm – 3:20 pm

Room: GC 4700

Instructor: Aishwarya Ghosh

Email: aishwarya.ghosh@utah.edu

Office Hours: Thursday after class (3:30 pm – 4:30 pm) / By appointment

Overview:

Econometrics focuses on developing statistical techniques to estimate economic relationships, test economic theories, and evaluate and implement policies and business decisions, addressing the challenges of working with non-experimental economic data. In this course, students will learn to analyze data through the perspective of an economist. Building on the foundation of ECON3640, Probability and Statistical Inference for Economists, this course introduces key econometric concepts and techniques, such as regression estimation and inference. The class integrates both theoretical and applied elements, enabling students to grasp the principles behind widely used statistical software, analyze real-world economic data, and use statistical tools to empirically answer economic questions.

Course objectives:

By the end of this course, students will be able to:

1. Analyze the real-world economic questions by applying descriptive and estimation techniques.

2. Have a good understanding of fundamental ideas underlying multivariate regression analysis.

3. Work with R to prepare and perform econometric exercises with real data sets.

4. Collect, analyze, summarize, and present economic data in an informative and concise way.

Prerequisites:

A grade of 'C-' or higher in either ECON 3640 or OIS 3440, or a grade of 'B' or higher in MATH 1070, OIS 2340, or BCOR 2030, or an AP Statistics score of 3 or above.

Primary References

This course will primarily follow the textbook: Studenmund, A. H. (2017). Using Econometrics: A Practical Guide (7th ed.). Pearson. You can access the digital version of this book through the Bookshelf tab in Canvas. While older editions of the textbook are acceptable, please note that the chapter order and some content may differ.

The following are optional textbooks for additional consultation:

- Wooldridge, J. M., Introductory Econometrics: A Modern Approach, Cengage.
- Stock, J. H., & Watson, M. W., Introduction to Econometrics, Pearson.
- Gujarati, D. N., & Porter, D. C., Basic Econometrics, McGraw-Hill.
- Hanck, C., Arnold, M., Gerber, A., & Schmelzer, M., Introduction to Econometrics with R. {available at: https://www.econometrics-with-r.org/}

Students are also encouraged to keep up with current economic news. The Financial Times, The New York Times and The Wall Street Journal are excellent sources and they are free on campus. You may also want to peruse The Economist . Additionally, an excellent website where you can find op-ed pieces by leading economists is Project Syndicate.

Software Requirements:

Our classes will consistently include both theoretical and applied components. The applied portion will utilize R, a free, open-source statistical programming language. Given the applied nature of this course, we will learn Econometrics by actively practicing it, which includes learning to use R. Each module will provide the necessary commands and guidance through lectures and supporting documents.

I recommend using R through the RStudio IDE (Integrated Development Environment) for an optimal experience, though students are free to use any platform they prefer, such as the command prompt. Additionally, having access to a spreadsheet editor, such as Excel, is strongly recommended. University of Utah students can access Microsoft Office programs for free through Office 365.

No prior knowledge of R is required; the course is designed to guide students step-by-step through the applied lectures.

- Download R: https://cloud.r-project.org/
- Download R Studio: https://rstudio.com/products/rstudio/

Assignments, Exams, and Grading:

Weekly Discussions (15%): We have fifteen discussions that constitute 15% of the total credit, one for each module. These discussions will take at the beginning of the class. You are required to write the meaning of each of the important terms in that module. These discussions are designed to help you review the key concepts of this course and keep up with contents on a regular basis.

Problem Sets (25%): There will be 5 Problem Sets, that will be comprised of, in general, 2-3 weeks of content. Students will be asked to answer theoretical and applied problems, strongly based of lecture notes. Students will have 10 days to complete each problem set.

Midterm Exam (25%): This class will have one midterm exam. The midterm will follow a similar structure as the Problem Sets', just covering the first 8 weeks of the class. Students will have 7 days to complete each exam, uploading an R script with the necessary code, results and interpretations.

- Due March 11

Research Project (35%): The goal of the applied research project is to provide students with hands-on experience. Students will be responsible for formulating a research question, gathering relevant data (either cross-sectional or time-series), and applying appropriate econometric techniques to answer their question by the end of the project. Students may work individually or in pairs. If planning to work in pairs, students must inform the instructor beforehand. Individuals must submit a project between 8 and 10 pages in length, while pairs must submit a project between 13 and 15 pages in length. These page limits include required econometric outputs and the bibliography. If you are working in pairs, each member should make a separate submission. The instructor will provide assistance upon request and make available a template and examples of projects from previous semesters to serve as references. Feel free to choose whether to work individually or in pairs.

- Due April 29

Important note 1: For any assignment, if an answer contains a direct "Copy+Paste" from the lecture notes, or if it is copied from someone else's work, no credit will be given. Read more in the Academic Dishonesty section, on page 7.

Important note 2: All assignments, except for quizzes and the Final, are due on Sundays. Late assignments will be accepted up to 24 hours after the due date with a 20% late penalty. Submissions made later than 24 hours without prior communication will not receive credit.

Grading system follows the university standards:

- Excellent, superior performance: A (93-100%), A- (90-92.9%)
- Good performance: B+ (87-89.9%), B (83-86.9%), B- (80-82.9%)
- Standard performance: C+ (77-79.9%), C (73-76.9%), C- (70-72.9%)
- Substandard performance: D+ (67-69.9%), D (63-66.9%), D- (60-62.9%)
- Unsatisfactory performance: E (0-59.9%)

Class Policies

You can expect me to:

- Grade and provide feedback on assignments and exams within one week of the due date.
- Reply to emails/messages within 24 hours during weekdays and within 48 hours on weekends and holidays.
- Hold weekly office hours where students can ask questions and discuss any issues or concerns related to our class.

I expect students to:

- Arrive to class on time and maintain their computer or related equipment to effectively participate in the course.
- Check announcements and new content updates promptly.
- Take exams on the scheduled dates. Makeup exams will only be allowed in emergencies with valid proof.
- Respectfully participate in in-class discussions and activities.
- Notify me immediately in the event of an emergency that prevents you from completing an exam, assignment, or the course.

- Ask questions if any expectations or assignments are unclear.

Tentative Course Schedule:

WEEK	CONTENT
Week 1	Course introduction, M1: Stats Review
Week 2	M2: What is an Econometric Model/ R Tutorial
Week 3	M3: Regression (simple, multivariate)
Week 4	M4: The Classical Linear Regression Model (CLRM).
Week 5	M5: Hypothesis Testing (part 1).
Week 6	M6: Hypothesis Testing (part 2)
Week 7	M7: Specification: Choosing the Independent Variables (OVB)
Week 8	M8: Specification: Choosing a functional form
Week 9	M9: Midterm Week/ M10: Multicollinearity
Week 10: Spring Break	
Week 11	M11: Serial Correlation
Week 12	M12: Heteroscedasticity
Week 13	M13: Binary Dependent Variable Models
Week 14	M14: More on Times-Series Data/ Advanced Time series methods
Week 15	M15: Introduction to Panel Data
Week 16	M15: Advanced Panel Data methods

DISCLAIMER

Syllabus Subject to Change: This syllabus is intended to serve as an outline and guide for our course. Please note that I may make modifications with reasonable notice to you.

Changes to the Course Schedule may also be made to better accommodate the needs of our class. Any updates will be announced in class and posted on Canvas.

Important Dates

- Classes begin: Monday, Jan 6th
- Last day to add/drop classes: Friday, January 17th
- Martin Luther King Jr. Day holiday: Monday, January 20
- Presidents Day holiday: Monday, February 17
- Last day to withdraw from classes: Friday, February 28
- Midterm Exam: Due March 11
- Spring break: March 9-16
- Research Project Due: Due April 29

University Policies:

1. The Americans with Disabilities Act: The Department of Economics at the University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you need accommodations in this class, reasonable prior notice needs to be given to the instructor and to the Center for Disability Services (162 A. Ray Olpin Student Union Building, 581-5020 (V/TDD)) to make arrangements for accommodations (more information can be found here). All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.
2. University Safety: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. More information regarding safety and to view available training resources (including helpful videos) can be found here.
3. Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801|581|7066. For support and confidential consultation, contact the Center for Student Wellness, SSB 328, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

4. Undocumented Student Support: Immigration is a complex phenomenon with broad impact - those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit the Dream Center website.

5. Wellness Statement: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness: www.wellness.utah.edu, 801-581-7776.

6. Student Names & Personal Pronouns: Class rosters are provided to the instructor with the student's legal name as well as "Preferred first name" (if previously entered by you in the student profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected.

7. Academic Dishonesty: The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University Student Code. Acts of academic dishonesty include but are not limited to:

• Cheating: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:

- Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done individually.
- Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments.
- Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work.
- Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission.
- Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity.
- Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.

• Falsification: altering or fabricating any information or citation in an academic exercise or activity.

•Plagiarism: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and

clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

8. Diversity/Inclusivity: I stand in support of compassion, dignity, value-of-life, equity, inclusion and justice for all individuals regardless of color, race/ethnicity, sexual orientation, religion, language, socioeconomic status, ability, gender, gender identity or expression, immigration status, or any type of marginalization. I stand in support of making our society more inclusive, just, and equitable for all individuals. I stand against individual and systemic racism in all its various forms.