



AEC 626: Advanced Econometrics III

Credits: 4

Course Meeting Times: Mondays/Wednesdays 10:00 – 11:50 am WALD 132

Prerequisites: AEC 624, AEC 625

Course Catalog Description

Develops non-linear econometric methods and applications, including M-estimators, non-linear least-squares, discrete choice, limited dependent variables, quantile regression, and machine learning. Focuses on an applied orientation, emphasizing problems of data measurement, model selection, and model specification encountered in practical applications of econometrics.

Professor

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Extra Help Hours: Mondays 1 – 2 pm ; Thursday 4 – 5 pm in 212 Ballard

Course Objectives

Our objectives for this course are to:

- To increase the depth and breadth of students' knowledge and understanding of applied econometric analysis
- To cover the theory and application of econometrics at a level appropriate for PhD students in applied economics
- To give students exposure to common problems encountered by applied econometricians and to direct students to possible solutions to these problems
- To prepare students to conduct high quality applied econometrics as part of their thesis research
- To enable students to critically evaluate and contribute to the applied econometrics literature
- To provide students with experience in effectively applying econometric models and tools

Learning Resources

Required Text:

Econometrics (2022) by Bruce Hansen – Princeton University Press, Princeton, NJ

Recommended Supplemental Books:

Microeconometrics using Stata Vol. 1 and 2, 2nd Edition (2022) by A. Colin Cameron and Pravin K. Trivedi – Stata Press, College Station, TX

Discrete Choice Methods with Simulation, 2nd Edition by Kenneth E. Train, Cambridge University Press, New York, NY.

Available for **free online: <https://eml.berkeley.edu/books/choice2.html>

Software: *Stata*

Measurable Student Learning Outcomes

Upon successful completion of this course, a student will be able to:

1. Compare and contrast accepted and appropriate applied econometric methods
2. Match econometric techniques with underlying data types and economic models and questions
3. Critically evaluate and contribute to the applied econometric literature
4. Critique pitfalls, problems and their solutions that arise in applied econometric research
5. Apply econometric tools at a level where students can make novel contributions to the scholarly literature in economics.

Evaluation of Student Performance

This class will have four problem sets which will feature a mix of analytic problems, Monte Carlo simulations with Stata, and replication exercises using datasets from the published literature. Exams will cover material presented in class, assigned readings, and problem sets.

Late work policy: All due dates are firm.

Assignment	Percentage of Final Grade
4 Problem Sets (10% each)	40
Midterm Exam	30
Final Exam	30
Total	100

Topics and Tentative Schedule

Week	Topics (<i>Required Readings</i>)	Problem Sets/Exams
1	- M-estimators (<i>Hansen Ch. 22</i>) - Non-linear Least Squares (<i>Hansen Ch. 23</i>) - Logs with Zeros (<i>Chen & Roth 2024</i>)	
2	Quantile Regressions (<i>Hansen Ch. 24; DePaula 2020</i>)	
3	- Finish Quantile Regression (<i>Hansen Ch. 24</i>) - Start Binary Choice (<i>Hansen Ch. 25</i>)	Problem Set #1 due Mon. @ 5 pm
4	Binary Choices issues, including IV and Panel Data (<i>Hansen Ch. 25.11 – 25.13</i>)	
5	Review for Midterm on Mon.	Problem Set #2 due Mon. @ 10 am Midterm Exam in-class on Wed. 4/29.
6	Discrete Choice with multiple choices (<i>Hansen Ch. 26; Train Ch. 2-3</i>)	
7	Censoring & Sample Selection (<i>Hansen Ch. 27</i>)	
8	- Model Selection (<i>Hansen Ch. 28.1 – 28.9</i>) - Machine Learning – Lasso (<i>Hansen Ch. 29.1 – 29.4, 29.8 – 29.12</i>)	Problem Set #3 due Mon. @ 5pm
9	- No Class Mon. (Memorial Day) - Machine Learning – Lasso for inference (<i>Hansen 29.20 – 29.22</i>)	
10	- Finish Machine Learning - Review for final	Problem Set #4 due Tues. @ 5pm
Finals Week		Final Exam Thurs 6/11 @ 2pm

Course Statements

Academic Calendar: All students are subject to the registration and refund deadlines as stated in the Academic Calendar: <https://registrar.oregonstate.edu/osu-academic-calendar>

Statement Regarding Students with Disabilities: Oregon State University is committed to making learning experiences accessible to all, which includes consideration of the course design,

course learning outcomes, and barriers experienced by the disabled student. Disability Access Services (DAS) staff and students work together to determine reasonable accommodations. Students connected with DAS who have questions about their accommodations should reach out to their DAS Adviser. Students who have not yet completed the process for setting up accommodations, please contact DAS at 541-737-4098, visit the [DAS website](#) or email disability.services@oregonstate.edu to explore accommodations for a disability (e.g., mental health diagnoses, chronic health conditions, learning disabilities, physical conditions/injuries, etc.). Students and faculty members are encouraged to collaborate around the implementation of accommodations.

Statement Regarding Religious Accommodation: Oregon State University is required to provide reasonable accommodations for employee and student sincerely held religious beliefs. It is incumbent on the student making the request to make the faculty member aware of the request as soon as possible prior to the need for the accommodation. See the [Religious Accommodation Process for Students](#).

Expectations for Student Conduct: Student conduct is governed by the university's policies, as explained in the Student Conduct Code (<https://beav.es/codeofconduct>).

Student Bill of Rights: OSU has twelve established student rights. They include due process in all university disciplinary processes, an equal opportunity to learn, and grading in accordance with the course syllabus: <https://asosu.oregonstate.edu/advocacy/rights>

Reach Out for Success: University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at oregonstate.edu/ReachOut. If you are in immediate crisis, please call or text the Suicide & Crisis Lifeline at 988.

Academic Integrity: Integrity is a character-driven commitment to honesty, doing what is right, and guiding others to do what is right. Oregon State University students and faculty have a responsibility to act with integrity in all our educational work, and that integrity enables this community of learners to interact in the spirit of trust, honesty, and fairness across the globe.

Academic misconduct, or violations of academic integrity, can fall into seven broad areas, including but not limited to: cheating; plagiarism; falsification; assisting; tampering; multiple submissions of work; and unauthorized recording and use.

It is important that you understand what student actions are defined as academic misconduct at Oregon State University. The OSU Libraries offer a [tutorial on academic misconduct](#), and you can also refer to the [OSU Student Code of Conduct](#) and [the Office of Student Conduct and Community Standard's website](#) for more information. More importantly, if you are unsure if something will violate our academic integrity policy, ask your professors, GTAs, academic advisors, or academic integrity officers.

Use of LLMs Statement: The use of Large Language Models (LLMs) like ChatGPT for this class is discouraged. LLMs are not a substitute for creative input and thinking. A [recent study at MIT](#) even suggests AI use in writing actually affects your brain negatively and **reduces your ability to think**. In this class, you will develop strong analytical skills using real-world examples, which cannot be outsourced to generative AI tools. LLM tools provide responses based on the vast amount of text in its database. While they can provide helpful information and may spur your thinking, they are not a reliable source and cannot provide citations or references to reliable data or evidence. I expect that all of your submitted work is your own. If you do decide to use LLMs for any assignment, you must indicate that you did and cite it (See [How to Cite ChatGPT](#) (APA style)).

Please add a parenthetical explaining how you prompted the AI tool if you quote or otherwise use ideas from an AI tool. Remember that the OSU Student Conduct Code defines Academic Misconduct as “an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research.” You may not use the output of an AI tool/LLM and claim it as your own, ***for your own integrity and to develop your own skills.***

Lauren’s Promise: I will listen and believe you if someone is threatening you. Lauren McCluskey, a 21-year-old honors student athlete, was murdered on October 22, 2018, by a man she briefly dated on the University of Utah Campus. We must all take actions to ensure this never happens again. Any form of sexual harassment or violence will not be excused or tolerated at Oregon State University. All individuals who are participating in university programs and activities have the right to do so fully, free from sexual discrimination, misconduct, and retaliation. The university prohibits sexual misconduct of any kind, including sexual harassment, intimate partner violence, sexual exploitation, and stalking. When such misconduct occurs, the university will take steps to stop, prevent recurrence, and remedy the impacts of such behavior. **If you feel you are in danger, call 911.** All Oregon State University employees are considered "Responsible Employees" and must consult with the Office of Equal Opportunity and Access when they are ***made aware or have reason to believe*** that a violation of the Sexual Misconduct and Discrimination policy has occurred. However, the university makes several confidential offices available to those who have been affected by sexual misconduct or discrimination. The following offices do not report sexual assaults or other sexual misconduct or discrimination claims to other university offices, but can refer students and employees to resources and services both on campus and within the community: [Survivor Advocacy and Resource Center \(SARC\)](#), [Counseling and Psychological Services \(CAPS\)](#), [Student Health Services \(SHS\)](#), and the [University Ombuds](#).