Econ 4223: Econometric Analysis

University of Oklahoma
Spring 2021

Instructor:	Tyler Ransom
Office:	CCD1 Room 322
Email:	ransom@ou.edu
Office Hours:	T 10:00am-11:00am, Th 12:30pm-1:30pm, and by appointment
Class Location:	Dale Hall 122
Class Times:	Tue/Thu 11:00am - 12:15pm
Final Exam Location:	Dale Hall 122
Final Exam Time:	Wednesday, May 12, 8:00am - 10:00am
Teaching Assistant:	TBA
Office:	TBA
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Course Description

This course is designed to help students learn the conceptual and statistical machinery that form the foundation of economic research. The course will also help students develop skills in using computer software to perform data analyses.

Student Learning Outcomes

By the end of the course, students should be able to do the following:

1. Demonstrate an understanding of the theoretical foundations of estimating and testing the basic regression model, employing tools from statistics (including calculus).

2. Perform basic regression and testing procedures using the R programming language

3. Complete an empirical research project that includes the following elements

   - Formulate an econometric model.

   - Collect and prepare relevant data for use in estimating the model.

- Use appropriate methods of estimation.
- Test relevant behavioral hypotheses.
- Understand and test the Gauss-Markov assumptions.
- Analyze and interpret the estimated model.
- Prepare a written report summarizing the research results.

For further detail on course content, see the course schedule at the end of this document. This is a 3-credit-hour course, which means we will have about 3 hours per week of class. You should expect to spend, on average, another 4-6 hours per week outside of class on reading, preparation, homework, and review.[1]

Prerequisites

- Econ 1123 (Principles of Microeconomics) is required

- Econ 2843 (Elements of Statistics) is required

- Econ 3113 (Intermediate Microeconomics) is required

Textbook and other materials

Materials for the course will be assigned from the following sources:

1. The e-textbook for this course will be *Introductory Econometrics: A Modern Approach* (7th ed.), by Jeffrey M. Wooldridge. You should purchase **Cengage Unlimited**, which is $120 and gives you access for the semester to all Cengage publications. You can purchase this from the OU Bookstore or from `cengage.com`. You can also rent a print version of the textbook for the semester for an additional $8. If you want a looseleaf version that you can keep, it is an additional $40.

2. *R for Data Science* (by Hadley Wickham and Garrett Grolemund), e-Book available for **free** here (paperback copy available from Amazon for $18.17)

3. *Using R for Introductory Econometrics* (by Florian Heiss), e-Book available for **free** here (paperback copy available from Amazon for $26.90)

4. *Econometrics in R* (by Grant V. Farnsworth), reference guide (PDF) available for **free** here

Course website

Class announcements and homework will be posted on the course website on Canvas: `https://canvas.ou.edu`. It is your responsibility to check the site regularly—at least every day class is held. All important announcements will be posted there.

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[1]From OU's "How to Graduate a Sooner" webpage: "On average, you should expect to spend 2-3 hours outside of class studying for each credit hour you are taking." (`http://www.ou.edu/graduatesooner/resources/graduate_a_sooner.html`)

Grading policies

Your grade will be determined by the following criteria:

- Problem sets (15%)

  - 6 problem sets throughout the semester; lowest score will be dropped. Consist of proofs, derivations, and empirical exercises in R. You may work on these in groups but you must turn in an individual copy.

- Class participation (25%)

  - Open-book reading quizzes taken online before each class period (lowest two scores dropped); in-class activities.

- Midterm exam (15%)

- Comprehensive final exam (20%)

  - The final exam will be cumulative, and it will account for 20% of the course grade. Students whose final exam score exceeds their midterm score will receive the final exam score for the midterm exam if the midterm score was lower. **Students who do not take the final exam will receive a zero for both the Midterm and the Final**.

- An original econometric research paper (25%); more details on separate document in Canvas

  - Proposal (due during approximately the 5th week of the semester—see assignment schedule at end of this document and on Canvas)
  - Initial R analysis file (due during approximately the 9th week of classes)
  - Polished initial draft (due during approximately the 11th week of classes and distributed to another class member)
  - Reading and commenting on a fellow student's draft
  - 3–5 minute in-class presentation of findings
  - Final draft (due on the last day of class)

Exam regrading   Exams are graded carefully and original grades are rarely changed. If you believe that a grading mistake was made on your work, you can submit a written request for a regrade to me within one week of its return. This request must contain a detailed explanation of the grading errors. Your entire exam will be regraded and the score may go up or down as a result.

N.B.   I do not release end-of-course grades before they are posted by the Registrar. Federal regulations prohibit me from revealing any grade to you by email. Grades will be updated on the course website on Canvas throughout the semester.

Grading scale

All exams will be out of 138 points. At the end of the course, I will compute a final percentage grade based on component percentages of each grade category using the weights given above. I will then convert this final percentage grade into letter grades according to the following scale (where g indicates your final percentage grade):

$$
\begin{array}{rccl}
90\% \leq & g & \leq 100\% & \text{A} \\
80\% \leq & g & < 90\% & \text{B} \\
70\% \leq & g & < 80\% & \text{C} \\
60\% \leq & g & < 70\% & \text{D} \\
0\% \leq & g & < 60\% & \text{F}
\end{array}
$$

I reserve the right to scale upwards everyone's final percentage grades by a common factor (e.g. 1.1), but the course will not be graded on a curve, and no one's final percentage grade will be lowered.

Classroom etiquette

I value your presence in my class, and I want your classmates to feel the same way. You are welcome to eat/drink during class as long as food/drink is permitted in the classroom and you do not disrupt or distract others by doing so. Note that smoking is prohibited on all OU property. Please silence your cell phones, pagers, or other electronic devices during class, and do not use them in the classroom. If you need to respond to a text/social media message, or make a phone call, please leave the classroom before doing so. You should bring your laptop to class (if you have one), as we will do in-class exercises almost every class period. Please do not use your laptop for work that is not directly related to what we are doing in class. Doing so has been scientifically proven to reduce your own academic performance, as well as that of your peers.[2]

Contacting me

I will always be available during my office hours. You may also stop by my office anytime my door is open. If you would like to meet with me outside of class but are unable to make it during my office hours, please sign up to meet with me at https://tyleransom.youcanbook.me.

If you ever need to email me or any other professor at OU, please follow the basic rules contained at the following link: http://www.jamestierney.com/teaching/how-to-email-a-professor/

I will promise to reply to your email within 48 hours of your sending it.

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[2]See, for example, this NYT column.

Course Policies

Make-up Policy

All work should be turned in on the day it is due. Late work will only be accepted for university-excused absences, illnesses, or other unforeseen emergencies.

Absences

Absences from class will only be excused for university approved reasons, illnesses, or other unforeseen emergencies.

University Policies

Religious Observance

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

Reasonable Accommodation Policy

If a student requires an accommodation based on disability, the student should meet with me in my office during the first week of the semester. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels. The Disability Resource Center is located in the University Community Center at 730 College Avenue (405-325-3852).

Academic Integrity

I do not tolerate academic misconduct, and neither does the University of Oklahoma:

> "Academic misconduct is cheating. More precisely, it is any action that a student knows (or should know) will lead to the improper evaluation of academic work. If the professor does not detect it, academic misconduct defeats the purpose of academic work because you are pretending to know more or write better than you actually do. ...
>
> "At OU, acts of plagiarism can receive institutional penalties ranging from a letter of reprimand to required coursework to expulsion. All academic misconduct offenses also receive grade penalties determined by the instructor. Grade penalties are not restricted to the value of the assignment and may be up to an F in the course. Juniors and seniors who plagiarize any significant portion of a paper should expect at least a suspension for a spring or fall semester. Under the right circumstances even freshmen and sophomores may also receive suspensions or even be expelled for plagiarism."
> —http://integrity.ou.edu/files/nine_things_you_should_know.pdf

For further information on what constitutes academic misconduct, as well as how such misconduct is punished, please consult the Student Guide to Academic Dishonesty, found at the following link:

https://integrity.ou.edu/students.html

I will not hesitate to fail students who do not fully comply with the University's academic misconduct policy. If you find yourself contemplating cheating, plagiarism, or other forms of academic misconduct, please come see me first. Help is available if you are struggling. I want everyone in the class to try their best and to do their own work. Please be advised that I reserve the right to utilize anti-plagiarism resources such as *TurnItIn* when grading assignments.

Title IX Resources and Reporting Requirement

For any concerns regarding gender-based discrimination, sexual harassment, sexual assault, dating/domestic violence, or stalking, the University offers a variety of resources. To learn more or to report an incident, please contact the Sexual Misconduct Office at (405) 325-2215 (8 to 5, M-F) or smo@ou.edu. Incidents can also be reported confidentially to OU Advocates at (405) 615-0013 (phones are answered 24 hours a day, 7 days a week). Also, please be advised that a professor/GA/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office. Inquiries regarding non-discrimination policies may be directed to: Bobby J. Mason, University Equal Opportunity Officer and Title IX Coordinator at (405) 325-3546 or bjm@ou.edu. For more information, visit http://www.ou.edu/eoo.html.

Adjustments for Pregnancy/Childbirth Related Issues

Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact your professor or the Disability Resource Center at (405) 325-3852 as soon as possible. Also, see http://www.ou.edu/eoo/faqs/pregnancy-faqs.html for answers to commonly asked questions.

Class Schedule, Page 1

Class	Date	Topics to Cover	Pre-class reading	Due	In-class activity
1	Tue Jan 26	Intro to the course			Using MindTap; Installing R/RStudio
2	Thu Jan 28	Statistics review	W: Skim 1.1-1.4, Read Math Refr. C.1-C.3, C.6a-C.6b, C.6d	RQ1 (Canvas)	Exploring data
3	Tue Feb 2	Bivariate regression	W: 2.1-2.3	RQ2	Hypothesis testing
4	Thu Feb 4	Bivariate regression	W: 2.4-2.5	RQ3	Regression, interpretation
5	Tue Feb 9	Multiple regression	W: 3.1-3.2	**PS1**, RQ4	Multiple regression
6	Thu Feb 11	Multiple regression	W: 3.3-3.4	RQ5	Omitted Variable Bias
7	Tue Feb 16	Multiple regression	W: 3.5, 7.1-7.6 (skip 7.4c, 7.6a)	RQ6	Dummy variables, LPMs
8	Thu Feb 18	Inference	W: 4.1-4.3	**PS2**, RQ7	Simple hypothesis testing
9	Tue Feb 23	Inference	W: 4.4-4.6	RQ8	Joint hypothesis testing
10	Thu Feb 25	Review	None	**Paper proposal**	Review sheet
11	Tue Mar 2	GMT violations: heteroskedasticity	W: 5.2a, 8.1-8.2	RQ9	LM test, Robust SEs
12	Thu Mar 4	GMT violations: serial correlation	W: 10.1, 12.1-12.2, 12.6	RQ10, **PS3**	Serial corr. Robust SEs
13	Tue Mar 9	How to read in data; how to write paper	W: 19.2-19.3, 19.5	RQ11	Reading in data
14	Thu Mar 11	Midterm review	Midterm study guide (Canvas)		Q&A Session
15	Tue Mar 16	Midterm (in class)			Exam

Note: "W" stands for "Wooldridge"; "RQ" stands for "Reading Quiz"

Class Schedule, Page 2

Class	Date	Topics to Cover	Pre-class reading	Due	In-class activity
16	Thu Mar 18	GMT violations: $E[u|X] \neq 0$	W: 9.1-9.6 (skip 9.1a, 9.1b, 9.2b, 9.2c, 9.3)	RQ12	Work on Project
17	Tue Mar 23	IV	W: 15.1-15.2	RQ13, **Initial R analysis**	IV estimation
18	Thu Mar 25	IV	W: 15.3	RQ14, **PS4**	2SLS estimation
19	Tue Mar 30	Bounds Analysis		**No RQ**	Work on Project
20	Thu Apr 1	Time series	W: 11.1-11.3	RQ15	Work on Project
—	Tue Apr 6	**No class** (University Holiday)	W: 18.5	**Polished initial draft**	Time series forecasting
21	Thu Apr 8	Time series forecasting	W: 18.5	**Polished initial draft**	Time series forecasting
22	Tue Apr 13	Panel: First differences, fixed effects	W: 13.1,13.3,14.1	**Read/comment on fellow student's draft**	Work on Project
23	Thu Apr 15	Panel: Random Effects	W: 14.2	RQ16, **PS5**	Panel data methods
24	Tue Apr 20	Panel: Differences-in-differences	W: 13.2, 13.4 (skip 13.2a, 13.2b)	RQ17	Diff-in-diff
25	Thu Apr 22	Nonlinear models: MLE, probit, logit	W: 17.1	RQ18, **PS6**	Probit/Logit
26	Tue Apr 27	Review and student presentations		Project presentation	
27	Thu Apr 29	Review and student presentations		Project presentation	
28	Tue May 4	Review and student presentations		Project presentation	
29	Thu May 6	Review and student presentations		Project presentation	
—	Wed May 12	**Final Exam**		**Final draft**	

Note: "W" stands for "Wooldridge"; "RQ" stands for "Reading Quiz"