

ECON 405/605: Introduction to Econometrics, Section 001, Fall 2022

Lecture:	Tuesday and Thursday, 11:00 am – 12:15 pm,	Powers 110
Lab session:	Tuesday or Thursday, 5:30 pm – 8:30 pm,	Powers 112 (Econ Lab)
Instructor:	Y. Christy Zhou:	yichen2@clemson.edu (not g.clemson.edu) or via Canvas email
	Office:	Powers 320M
	Office Hour:	Shortly after the lecture time; or by appointment
TAs:	Louise Yue Hu:	yhu2@clemson.edu or via Canvas email
	Office:	Powers 318E
	Office Hour:	During the lab session; or by appointment

Course Objective and Expectation

Econometrics is the quantitative analysis tool that modern economists use to be a “detective” and learn about the behavior of agents participating in the economy, recover meaningful economic parameters, and predict counterfactuals (aka a parallel universe addressing “what ifs” questions). These tools equip people to master econometrics to conduct causal inference. This focus separates economics from many other disciplines in social sciences which instead focuses on establishing correlation which is important as well. The focus on generating reliable “what ifs” types of causal answers is also different from machine learning which instead focuses on generating the best prediction and data fitting.

This course is designed to help you (i) develop tools to conduct causal inference using econometrics and (ii) develop an intuition of causal analysis. This course is very intensive in both statistical theory and executing analysis in statistical software. Students are expected to formalize their economic questions using a linear regression model, interpret parameters estimated from a model, conduct basic predictions, and perform hypothesis tests. This course also trains you to get from correlation to causation by fighting various types of bias. You are expected to explain what factors may make an estimator vulnerable from bias and allow one to be a “bad economic detective”, and what tools you can use to fight bias to be a “better and more unbiased detective”.

Textbooks: W and AP

- **Required Main Textbook (W):** Introductory Econometrics: A Modern Approach, 7th edition, by **Jeffery M. Wooldridge**, Cengage Learning.
 - **Required: Access to eBook + MindTap assignments:**
Click the link “[S2208-ECON-4050 Intro to Econometric - 001 – 87369](#)” on canvas
You will be prompted to the Cengage MindTap.

- *Optional hardcopy book*: The online access described above already includes eBook chapters. However, if you are interested in having a hard copy in addition to the eBook, you can get a copy of the 7th edition or a previous edition from Amazon or other vendors. The 5th and 6th editions are 99.9% as good as 7th edition (new or used).
- **Required Secondary Textbook (AP)**: *Mastering Metrics: The Path from Causal to Effect*, by Joshua D. Angrist and Jorn-Steffen Pischke, Princeton University Press, ISBN: 978-0-691-15284-4
 - A used version is 99.99% as good as a new one.
 - Video clips by AP: <https://www.masteringmetrics.com/online-metrics-resources/>
 - Data and codes for book examples: <https://www.masteringmetrics.com/resources/>

Statistical Software

- We use STATA in this class. It is a versatile program for empirical economic and policy analysis.
- Purchase directly from the vendor:
 - <https://www.stata.com/order/new/edu/gradplans/student-pricing/>
 - The Stata/BE version is enough for this course. The student's 6-month license is \$48.
- Or, purchase from CCIT:
 - <https://ccit.clemson.edu/support/current-students/software-and-applications/individual-licenses/?id=928&l=1>
 - CCIT lists dated information such as price and operating system requirements. Make sure you consult CCIT to get the updated information if you plan to purchase from the CCIT.
- How to ask a coding question to your TA: Your TA can help you only if s/he knows exactly what you coded up. Your TA cannot help you if you say “I typed what was in the handout and it did not work” without showing your code.
- *Optional Stata reference book*: *Microeconometrics Using Stata: Revised Edition 2nd Edition*, by A. Colin Cameron and Pravin K. Trivedi, Stata Press, ISBN: 978-1597180733
 - We will use open-source tutorials in this class for the first few lab sessions, so it is not required to buy a Stata book. We will also teach you how to use help-files and Stata manuals, all of which are publicly available.
 - However, some of you may prefer to have a Stata book for reference. If this is your preference, my best recommendation is this book by Cameron and Trivedi (new or used). You can download all the datasets and Stata code (in do-files) they used here: <http://cameron.econ.ucdavis.edu/musbook/mus.html> and here: <https://www.stata-press.com/data/musr.html>

Pre-requisites and Co-requisites

- Pre-requisites: (1) ECON2110 and 2120 Principle of Microeconomics and Macroeconomics
(2) MATH1080 Calculus One
(3) STAT3090/MATH3090 Introduction to Statistics
- Co-requisites: (1) ECON4051/6051 Introduction to Econometrics Laboratory

Grading

- Letter grades (**no curve**)
 - A 85 – 100
 - B 75 – 85
 - C 65 – 75
 - D 55 – 65
 - F < 55
- Grades for this course will be based on
 - Group presentations 9 points (3 points each, 3 times)
 - Lab assignments 12 points
 - Assignments on MindTap 10 points
 - Midterm 1 23 points
 - Midterm 2 23 points
 - Final 23 points
- Lab assignments
 - Your TA will review the course material and assign simple tasks for you on STATA. You will be asked to analyze data and interpret statistics.
 - Possible points for each assignment: check minus (10 pts), check (11 pts), check plus (12 pts), or missing (0 pts).
 - Your total will be the average of all your lab work, say, 11.5 out of 12. I will drop the lowest lab work to allow you to miss a lab (or perform poorly on one lab).
 - You are encouraged to work in a group and discuss with other students. But you need to turn in your own lab assignment.
- Assignments on MindTap
 - You are encouraged to work in a group and discuss with other students. But you need to submit your own MindTap assignment. You have three attempts, and MindTap will keep the highest score.
 - Your total will be the *weighted* average of all your assignments, say, 9.2 out of 10. I will restore your lowest assignment to the full points to allow you to miss an assignment (or perform poorly on one assignment).
- Group presentations
 - There will be three rounds of group presentations. Each will be scheduled before each exam. I will post group discussion questions 1-2 lecture(s) before the presentation date. You will work with your group before the presentation and then present in class. If you miss a group discussion, you could try to sign up for two groups in the next round. But you cannot miss two presentations and do all three in the last round.
 - Here are some potential points for your reference:
 - 3.0 points 100% (equivalent to A++)
 - 2.8 points 93.3% (equivalent to A+)
 - 2.55 points 85% (equivalent to A)
 - 2.25 points 75% (equivalent to B)
 - 0.0 point 0% (missing)
- **Weight transfer between midterms and final:**

- Everyone has a bad day once in a while. A later and better-performed exam can replace an earlier exam(s).
E.g., if your midterm #2 is higher than midterm #1, then your midterm #1 shall be replaced by your midterm #2; If your final is higher than both midterms, then both of your midterms shall be replaced by your final.
- An earlier exam does not replace a later one, i.e., midterm #1 will not replace the final.
- Make-up exams, group presentations, and problem sets
 - I do **NOT** offer make-up assignments, presentations, nor exams. I respect students as responsible and consenting adults who understand the consequence of missing an exam or an assignment.
 - **Lab**: If you have a time conflict for the lab for a particular week, we can accommodate you and have you switch from Thursday to Tuesday (or vice versa) for a specific week, as long as you send me and your TA a request ahead of time.
 - **MindTap**: If you need a time extension on the MindTap assignment on a particular week due to planned responsibilities or emergencies (e.g., athletes traveling for away games, job fair, family events, sickness), you can submit a request. Everyone will be granted up to TWO extensions if and only if the request is made **before the deadline**. Requests made after the deadline will not be granted. Athletes who need additional extensions because of unexpected away games need to have his/her advisor send me a formal athletic travel notice ahead of time.
 - If you need a time extension for the MindTap assignment for truly unanticipated emergencies (e.g., power and internet outages and MindTap system bugs), send me a request via email **before** the deadline. You should send supporting evidence such as a screenshot of an error message on MindTap taken before the deadline. For evidence that takes time to collect, you can take your time and send me paper trails later, but you still need to submit a request promptly.
 - If a student needs accommodation for an exam or needs to change the time of the exam, it is the students' responsibility to (1) give me at least a 48-hour notice, (2) file proper documents and paperwork to me and the Clemson's Test Proctoring Center (TPC) to schedule a make-up. TPC has protocols and requires paperwork as well.
- Partial credit and re-grading policy
 - To request additional partial credit and re-grading a specific question on an exam, a student needs to file a one-page formal request along with your exam. Then I will look at the question requested as well as all other questions in the exam.
- University Regulation for Grade F/I and Students on Federal Aids
 - iROAR requires [instructor] to enter a student's last date of attendance when [an instructor] assign a final grade F or I. This is required for compliance with federal financial aid regulations. Students who receive federal financial aid, but who stop attending class, may be required to repay all or part of their student aid; therefore, it is important to differentiate between students who fail a class through poor academic performance and those who simply stop attending or never attend at all.

- Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to a class should let the professor know and make an appointment to meet with a staff member in Student Accessibility Services (SAS) as soon as possible. You can make an appointment by calling 864-656-6848 or by emailing studentaccess@lists.clemson.edu. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campus-life/campus-services/sds/>.
- If a SAS student expects accommodations for exams, let me know in the first week of class and file paperwork with the SAS and me.
- For a medical emergency that happens before an exam, please inform me before the exam and file paperwork with me and the SAS. For an unanticipated emergency that occurs precisely on the exam day, students are expected to file paperwork with me within 24 hours.

Honor Code and Academic Integrity

- Undergraduate Academic Integrity Statement: *As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.*
- The academic integrity policy is STRICTLY ENFORCED in this class. It is students' responsibility to comply with the academic integrity policy. Students who are found to have committed an act of academic dishonesty will (1) receive an F for this course and (2) be under the prosecution of the Academic Integrity Committee
- More information: <https://www.clemson.edu/academics/integrity/instructions.html> and <http://www.clemson.edu/studentaffairs/student-handbook/academic-policies/academic-integrity.html>

Title IX Statement

- Title IX Policy: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972.

- The University is committed to combatting sexual harassment and sexual violence. As a result, you should know that University faculty and staff members who work directly with students are required to report any instances of sexual harassment and sexual violence, to the University's Title IX Coordinator. What this means is that as your professor, I am required to report any incidents of sexual harassment, sexual violence or misconduct, stalking, domestic and/or relationship violence that are directly reported to me, or of which I am somehow made aware.
 - There are two important exceptions to this requirement about which you should be aware: Confidential Resources and facilitators of sexual awareness programs such as "Take Back the Night and Aspire to be Well" when acting in those capacities, are not required to report incidents of sexual discrimination.
 - Another important exception to the reporting requirement exists for academic work. Disclosures about sexual harassment, sexual violence, stalking, domestic and/or relationship violence that are shared as part of an academic project, a research project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX Coordinator.
- This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Ms. Alesia Smith is the Executive Director for Equity Compliance and the Title IX Coordinator. Her office is located at 223 Holtzendorff Hall, phone number is 864.656.3181, and email address is alesias@clemson.edu.

Copyright Statement

- University Regulation: Materials in courses should be considered to be copyrighted. They are intended for use only by students registered and enrolled in a particular course and only for instructional activities associated with and for the duration of the course. They may not be retained in another medium or disseminated further. They are provided in compliance with the provisions of the Teach Act. Students must seek permission from instructors to record any class activity, including lectures, discussions, and presentations. Students should be reminded to refer to the Use of Copyrighted Materials and "Fair Use Guidelines" policy on the Clemson University website for additional information (link <https://clemson.libguides.com/copyright>).

Reading and Tentative Schedule

- MindTap assignment: All problem sets are due on **Friday at 5:00 pm**. Try to start working on it at the latest Thursday so that if you have a technical problem such as a log-in problem, you can call MindTap support during their business hour before the due time.
- **The actual due date of PS may be subject to change. Check MindTap weekly for updates.**
- W refers to Wooldridge. W.1 means Wooldridge Chapter 1. W.A.1 means Wooldridge Appendix A Section 1. AP refers to the textbook by Angrist and Pischke.
- The topics highlighted by **(R)** are review sessions. If topics listed in **(R)** days are foreign to you, be prepared to spend hours and hours catching up. The topics highlighted by **(A)** are optional advanced topics that we may cover. Other extra reading will be posted on canvas.

Tuesdays		Thursdays (and Fridays for MindTap Deadline)	
		8/25	Topic 1. Empirical economic question AP. Introduction W.1 Economic data (1.1—1.4)
8/30	Topic 2. (R) Causal reasoning and testing population mean: The basics AP.1.1 Randomized trials pp 1—24 (R) W.C.2-3 Finite sample property, aka, mean and variance of \bar{X} (2a-2c, 3a-3b) (R) AP.1.Appendix pp 33—39 (R) W.B.3 Standardization (3g)	9/1	Topic 2. (R) Continue w/ mean testing: Hypothesis tests, T-test, confidence intervals, p-values (R) W.C.5 Confidence interval (R) W.C.6 Hypothesis testing (R) AP.1.Appendix pp 39—46
		9/2	<i>PS for Ch1. Nature of Econometrics & Econ Data</i>
9/6	Topic 3. Randomized trials (RT): Conduct RT using two-sample test AP.1 Randomized trials pp 1—33	9/8	Topic 3. Continue Topic 4. Introducing simple regression and its relation to two-sample test AP.2 Regression (2.1—2.2) W.2.1 Simple regressions W.2.7 Regression with a Binary
9/13	Topic 4. Continue Topic 5. Bivariate Regression: An introduction and the mechanics W.2.1 Simple regressions (R) W.A.2 Property of linear functions	9/15	Topic 5. Continue: Derive the bivariate OLS estimator $\hat{\beta}_1$ W.2.1 Simple regressions (R) W.B.4 Covariance, correlation (4a-4c) AP.2.Appendix pp 82—88
9/20	Topic 6. Bivariate OLS Examples	9/22	Topic 7. Residual and fit W.2.3 Residuals and Fit (3a—3b)
9/27	Topic 8. Variance of OLS estimator $\hat{\beta}_1$, Unbiasedness of $\hat{\beta}_1$ W.2.5 OLS estimator variance (5a—5c) AP.2.Appendix pp 95—97 AP.2 Regression (2.3)	9/29	Topic 8. Continue Topic 9. Guided reading Readings to be assigned
		9/30	<i>PS for Ch2. The Simple Regression Model</i>
10/4	** Midterm 1 **	10/6	Topic 9. Inference of a Single Parameter

		11/11	<i>PS for Ch6. Further Issues</i>
11/15	Topic 19. Interactions with dummies Topic 20. Other topics W.7.4 Interaction with dummies	11/17 11/18	Topic 21. An application Readings to be assigned <i>PS for Ch7. Binary and Dummy</i>
11/22	Topic 22. Difference-in-Differences W.13.2 Diff-in-Diff AP.5 Diff-in-Diff pp 178-205	11/24	** Thanksgiving Break **
11/29	Topic 23. Panel Data Regressions (Diff-in-Diff and Fixed Effect) W.14.1 Fixed effect W.13.3 Two-period panel	12/1 12/2	Topic 24. Instrumental variables W.15 Motivation of IV W.15.2 IV Estimation AP.3.1 IV <i>PS for Ch13. Simple Panel and Diff-in-Diff</i> <i>PS for Ch14. Advanced Panel</i>
12/6	Topic 25. IV Regression using 2SLS W.15.3 Two-Stage Least Square	12/8 12/9	Topic 25. Continue <i>PS for Ch15. IV</i>
12/14	** Final Exam ** Wednesday 3:00 pm – 5:30 pm Schedule of final shall follow the University schedule: https://www.clemson.edu/registrar/student-menu/exam-fall.html		