

SYLLABUS

Course Time and Location

Monday and Wednesday, 2:20-3:35pm, A203

Lab: Wednesday, 5:30-7:30pm, A203

Instructor Information

Seth Freedman, Associate Professor, O'Neill School of Public and Environmental Affairs

Office: O'Neill 355

Contact: freedmas@iu.edu

Office Hours: I offer flexible office hours. Just sign up for a time based on my calendar here: https://calendly.com/prof_freedman/office-hours-with-prof-freedman Links to an external site.

Teaching assistants

Maddy Yozwiak, myozwiak@iu.edu

Mallory Dreyer, mkdreyer@iu.edu

If you need help during the semester:

Questions specific to problem sets: Post your question to the class slack channel. Maddy, Mallory, and I will all monitor this channel. You are welcome to answer your peers' questions as well.

Questions about anything you are struggling with from lecture or class material in general: Sign up for a meeting with me.

Course Description

This is the second statistics course in the quantitative methods sequence required of all O'Neill Ph.D. students. The course intends to provide relevant Statistics and Econometrics skills for your future research in various academic fields in O'Neill. The contents of this course will be theoretical and practical, including hands on work using R.

Textbooks

Required books

Hansen, Bruce E. 2022. Econometrics. Princeton, NJ: Princeton University Press.

Joshua, and Jorn-Steffen Pischke. 2009. Mostly Harmless Econometrics. Princeton, NJ: Princeton University Press.

Long, Scott. 1997. Regression Models for Categorical and Limited Dependent Variables. Sage Publications. ([Amazon Link](#)[Links to an external site.](#))

Recommended books

Wooldridge, Jeffrey. Econometric Analysis of Cross Section and Panel Data. Second Edition. Cambridge, MA: MIT Press.

Cameron, A. Colin, and Pravin K. Trivedi. 2005. Microeconometrics: Methods and Applications. New York: Cambridge University Press.

Cameron, A. Colin, and Pravin K. Trivedi. 2010. Microeconometrics Using Stata, Revised Edition. College Park, Texas: STATA Press

Course Requirements

Exams

There will be a midterm and a final exam. The final exam will not be cumulative except to the extent that the material in the latter half of the course builds from the earlier material.

Weekly Assignments

Weekly problem sets will generally be assigned on Wednesday and due the following Tuesday night. These assignments will generally include a combination of two types of problems: data analysis problems that give you a chance to work with the course material in an applied setting using R, and conceptual problems that you will answer using some combination of mathematical analysis, social science theory, or reference to some underlying literature.

Assignments will be graded on a 10/8/5/0 scale. A 10 will be given if the assignment is nearly all correct; an 8 will be given if a few concepts were mistaken, but the work on the whole was complete and well done; a 5 will be given if multiple key concepts were missing and/or questions were insufficiently answered; and a 0 will be given if the assignment is incomplete. A 5 is meant to signal that there may be additional work you

need to do in grasping the key concepts. If you receive a 5 on any assignment, you should schedule an appointment with me to discuss what you were struggling with.

Lab Sessions

The course has weekly lab sessions, Wednesdays from 5:30-7:30. One of the TAs will facilitate each of the lab sessions.

You should think of the lab sessions as an integral part of the course. You should not skip them or think that they are optional. Lab work supports several of the course objectives. It gives you a structured opportunity to work with data and to implement the methods we discuss in class. They are group sessions and so they support discussions and conversations that are important for understanding the material and for learning how to participate in scholarly debates about statistics and econometrics.

Lab will include two components:

1.
 1. Review of past week's assignment: The TA will discuss a couple of key concepts from a past assignment. This could include showing some sample output, sample code, and conceptual discussion of some of the questions. They will not review the entire assignment, but focus either on concepts that many in the class struggled with or particularly important components.
 2. Preparing for current week's assignment: The TA will provide a tutorial on a particular topic or method related to that week's new assignment.

Grading

Weekly Assignments	50%
Midterm Exam	25%
Final Exam	25%

Attendance

Attendance and active participation in class is required. **HOWEVER, if you are ill you should not attend class.** Please keep me informed if you will be absent so I can work with you to continue making progress in the course during these absences and/or can catch up in the case of illness.

Course Schedule and Readings

Schedule Subject to Change. The below will be roughly a weekly guide.

H: Hansen, Econometrics

MHE: Angrist and Pischke, Mostly Harmless Econometrics

W: Wooldridge, Econometric Analysis of Cross Section and Panel Data

L: Long, Regression Models for Categorical and Limited Dependent Variables

Midterm Exam, Wednesday, March 5th, during lab time

Final Exam during Finals Week, Wednesday, May 7th, 12:40-2:40pm

1. **Review of OLS and Hypothesis Testing**
 - H: 5.9-5.12, 8.1, 9
2. **Review of Instrumental Variables and IV by Two Stage Least Squares**
 - MHE: 4
 - H: 12
 - W: 5
3. **Inference in Instrumental Variables and Weak Instruments Bias**
 - MHE: 4.2 & 4.6.4
 - H: 12
 - Andrews, Isaiah, James H. Stock, and Liyang Sun. "Weak instruments in instrumental variables regression: Theory and practice." *Annual Review of Economics* 11 (2019): 723-753
4. **Introduction to Panel Data**
 - MHE: 5
 - H: 17
 - Wooldridge: 10
5. **Fixed Effects and Omitted Variable Bias**
 - MHE: 5.1
 - H: 17
 - W: 10.1, 10.2, 10.5, 10.6
 - Almond, D., K. Chay, D. Lee, "The Costs of Low Birth Weight," *Quarterly Journal of Economics*, 120, 2005, 1031-1084.
 - Chetty, R, et al. (2011). "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project Star," *Quarterly Journal of Economics*, 126(4): 1593-1660.
6. **Two Way Fixed Effects and Difference-in-Differences**
 - MHE: 5.2
 - H: 18
 - W: 6.5
 - Wing, Coady, Kosali Simon, and Ricardo A. Bello-Gomez. "Designing difference in difference studies: best practices for public health policy research." *Annual Review of Public Health* 39 (2018)
 - Freedman, Seth, Alex Hollingsworth, Kosali Simon, Coady Wing and Madeline Yozwiak. "Designing Difference in Difference Studies With Staggered Treatment Adoption: Key Concepts and Practical Guidelines" NBER Working Paper 31842: <https://www.nber.org/papers/w31842> [Links to an external site.](#)
 - Wing, Coady, Freedman, Seth, and Hollingsworth, Alex. "Stacked Difference-in-Differences," NBER Working Paper 32054: <https://www.nber.org/papers/w32054> [Links to an external site.](#)
7. **Additional Fixed Effect Topics: DDD, Measurement Error, Lagged Dependent Variables**
 - MHE 5.3-5.4

- H: 17.36-17.39
- 8. **Dependent Errors and Cluster Robust Standard Errors**
 - MHE: 8
 - H: 4.21-4.23, 18.9
 - Bertrand, M., E. Duflo, and S. Mullainathan, "How Much Should We Trust Difference in Difference Estimates," *Quarterly Journal of Economics* 119(1), 2004, 249-276.
 - Cameron, A. Colin and Douglas L. Miller, "A Practitioner's Guide to Cluster-Robust Inference," *The Journal of Human Resources* 50(2), 2015, 317-372.
- 9. **Introduction to Non-Linear Models and Maximum Likelihood Estimation**
 - Long: 1 and 2
 - W: 13.1-13.3
- 10. **Models for Binary Outcomes: Logit and Probit**
 - MHE: 3.4.2
 - Long: 3
 - H: 25
- 11. **Inference and Interpretation in Binary Outcome Models**
 - Long: 3 & 4
- 12. **Non-Negative Outcomes**
 - Long: 8
 - H: 26.11
 - Wooldridge: 18
- 13. **Fixed Effect Poisson and wrap up**
 - Wooldridge: 18.7

Technical Support

For additional help with technical issues, consult:

- [University Information Technology Services \(UITS\)Links to an external site.](#) (human support)
- [IU Knowledge Base \(IUKB\)Links to an external site.](#) (guides)
- [IUwareLinks to an external site.](#) (download free software)

O'Neill School Expectations of Civility and Professional Conduct

The O'Neill School takes matters of honesty and integrity seriously because O'Neill is the training ground for future leaders in government, civic organizations, health organizations, and other institutions charged with providing resources for the public, and for members of society who are vulnerable and who are lacking in power and status. Precisely because O'Neill graduates tend to rise to positions of power and responsibility, it is critical that the lessons of honesty and integrity are learned early.

O'Neill requires that all members of its community – students, faculty, and staff – treat others with an attitude of mutual respect both in the classroom and during all academic

and nonacademic activities outside the classroom. A student is expected to show respect through behavior that promotes conditions in which all students can learn without interruption or distraction. These behaviors foster an appropriate atmosphere inside and outside the classroom:

- Students are expected to attend class regularly and to be prepared for class.
- Students must be punctual in their arrival to class and be present and attentive for the duration of the class. Eating, sleeping, reading the newspaper, doing work for another class, wandering in and out of the classroom, and packing up or leaving class early are not civil or professional behaviors.
- Students must abide by the course policy regarding use of electronic devices in the classroom.
- Students must responsibly participate in class activities and during team meetings.
- Students must address faculty members, other students, and others appropriately and with respect, whether in person, in writing, or in electronic communications.
- Students must show tolerance and respect for diverse nationalities, religions, races, sexual orientations, and physical abilities.
- Students must not destroy or deface classroom property nor leave litter in the classroom.

** These expectations are excerpted from the O'Neill School Honor Code which can be found

at: https://oneill.indiana.edu/doc/undergraduate/ugrd_student_honorcode.pdf Links to an external site.

Academic Integrity

Online Course Materials

The faculty member teaching this course holds the exclusive right to distribute, modify, post, and reproduce course materials, including all written materials, study guides, lectures, assignments, exercises, and exams. While you are permitted to take notes on the online materials and lectures posted for this course for your personal use, you are not permitted to re-post in another forum, distribute, or reproduce content from this course without the express written permission of the faculty member. Any violation of this course rule will be reported to the appropriate university offices and officials, including to the Dean of Students as academic misconduct.

Note Selling

Several commercial services have approached students regarding selling class notes/study guides to their classmates. Selling the instructor's notes/study guides in this course is not permitted. Violations of this policy will be reported to the Dean of Students as academic misconduct (violation of course rules). Sanctions for academic misconduct may include a failing grade on the assignment for which the notes/study guides are being sold, a reduction in your final course grade, or a failing grade in the course, among other possibilities. Additionally, you should know that selling a faculty member's notes/study guides individually or on behalf of one of these services using IU email, or via Canvas

may also constitute a violation of IU information technology and IU intellectual property policies; additional consequences may result.

Plagiarism and Academic Dishonesty

Absolute integrity is expected of every IU student in all academic undertakings. Integrity entails a firm adherence to a set of values, and the values most essential to an academic community are grounded on the concept of honesty with respect to the intellectual efforts of oneself and others. Academic integrity is expected not only in formal coursework situations, but in all University relationships and interactions connected to the educational process, including the use of University resources. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance should be acknowledged, and the student's academic position truthfully reported at all times. In addition, students have a right to expect academic integrity from each of their peers. For further information regarding the Code of Academic Integrity, see: <http://www.iu.edu/~code/Links to an external site.>

Additional Information

1. Counseling and Psychological Services For information about services offered to students by CAPS: <http://healthcenter.indiana.edu/counseling/index.shtml>[Links to an external site.](#)

2. Accessible Educational Services (formerly Disability Services for Students)

Securing accommodations for a student with disabilities is a responsibility shared by the student, the instructor, and the AES Office. For information about support services or accommodations available to students with disabilities, and for the procedures to be followed by students and instructors: <https://studentlife.indiana.edu/student-support/iub-aes/index.html>[Links to an external site.](#)

3. Religious Observance Students missing class for a religious observance can find the officially approved accommodation form by going to the Vice Provost for Faculty and Academic Affairs [webpage for religious accommodations \(Links to an external site.\)](#). The form must be submitted at least 2 weeks prior to the anticipated absence.
4. Sexual Harassment. As your instructor, one of my responsibilities is to help create a safe learning environment on our campus. Title IX and our own Sexual Misconduct policy prohibit sexual misconduct. If you have experienced sexual misconduct, or know someone who has, the University can help.

If you are seeking help and would like to talk to someone confidentially, you can make an appointment with:

1. The Sexual Assault Crisis Service (SACS) at 812-855-8900
2. Counseling and Psychological Services (CAPS) at 812-855-5711
3. Confidential Victim Advocates (CVA) at 812-856-2469
4. IU Health Center at 812-855-4011

For more information about available resources: <http://stopsexualviolence.iu.edu/help/index.html>Links to an external site.. It is also important to know that federal regulations and University policy require me to promptly convey any information about potential sexual misconduct known to me to our campus' Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, they will work with a small number of others on campus to ensure that appropriate measures are taken and resources are made available to the student who may have been harmed. Protecting a student's privacy is of utmost concern, and all involved will only share information with those that need to know to ensure the University can respond and assist. I encourage you to visit <http://stopsexualviolence.iu.edu/help/index.html>Links to an external site. to learn more.