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1. Course Information

Instructor: Erich Battistin
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Room 2212, Symons Hall
ebattist@umd.edu

Office Hours: We 1:00pm – 2:30pm (by appointment only)

Lectures: Tu 3:30pm – 6:00pm (SYM 0209)

2. Course Description, Goals, and Expectations

2.1 Aims

I discuss empirical strategies in applied micro research aimed at evaluating the causal effects of policies or programs on desired outcomes. These strategies collectively form the contemporary toolbox for conducting causal inference in various academic domains, including public policy, development economics, labor economics, education, marketing, and corporate finance. They also find applications in industries and international organizations. This course caters to second-year Ph.D. students equipped with a quantitative background comparable to that provided in [AREC623](#). While the course does encompass theoretical and formal econometric reasoning, its primary focus lies in fostering design-oriented identification using observational data. My exploration of strategies stems from the prerequisites needed to replicate the conditions of an ideal experiment, which serves as the foundation for addressing the underlying causal query. The lectures are structured into self-contained modules, each dedicated to specific strategies, with rotation taking place across academic years. The curriculum covers a range of methodologies, including regression and matching, instrumental variables and natural experiments, differences-in-difference designs, synthetic control methods and regression discontinuity designs. Practical coding of these empirical strategies for application in real-world scenarios will also be extensively discussed in the lectures.

2.2 Learning Outcomes

Fall 2023 lectures will focus on instrumental variables, differences-in-difference designs, synthetic control methods, and regression discontinuity designs. Students completing this course will be able to critically appraise the appropriateness of these strategies for walking the path from cause to effect at a good level of technical difficulty. Students will also learn how to use cutting-edge methodologies in their research using the empirical strategies considered.

2.3 Requirements for Students

Before the semester starts. Students attending this course are expected to be proficient with the fundamentals of probability and mathematical statistics, as well as with the tools of causal reasoning and identification. You are invited to look at past exams to familiarize with learning outcomes, expectations and the level of formalization expected. A summary of prerequisites can be found, for example, in the course materials for [AREC623](#).

After the semester starts. The material I intend to cover may be challenging at times. You are invited to read course materials and lecture slides before coming to class. You will internalize the concepts much more clearly if you spend time struggling with the material before class starts. Although proficiency in the use of Stata (or similar software) is not required, you will learn more by tailoring the empirical strategies discussed in lectures to your own research projects. You are warmly encouraged to do so by implementing the empirical strategies reviewed in lectures using the statistical software of your choice.

2.4 Course Website and Contents

Lecture slides, course program and reading materials are at the course [website](#). Each block of slides will be made available approximately one week before being used in lectures. Reading materials can be accessed through the UMD library network. Past exams and any other materials will be available through Canvas.

2.5 Course Readings

We will mix traditional approaches to causal inference with more modern tools used in several literatures. For this reason, it is impossible to identify one textbook, and readings are primarily articles and working papers listed in the course website. Lecture slides are self-contained and may be enough to understand the topics discussed. However, you are strongly invited to not limit your study to slides, and it is in your interest to familiarize with the additional readings suggested in the course website and during lectures. Although we are not going to follow one textbook, our discussions will use materials from the following manuals, which you may find useful in the remainder of your Ph.D. as well.

- Scott Cunningham (2021). “[Causal Inference: The Mixtape](#)”. Yale University Press.
- Hernán Miguel A., and Robins James M. (2020). “[Causal Inference: What If](#)”, Boca Raton: Chapman & Hall/CRC.
- Guido W. Imbens, and Donald B. Rubin (2015). “[Causal Inference for Statistics, Social, and Biomedical Sciences](#)”, Cambridge University Press.
- Stephen L. Morgan, and Christopher Winship (2015). “[Counterfactuals and Causal Inference](#)”, Cambridge University Press.

2.6 Exams and Grading

Exams. Your final grade will be computed as weighted average of three components.

- A mandatory midterm (35% of the final grade).
- A final during exam week (35% of the final grade).
- Coursework with a final presentation (30% of the final grade).

Exams may include questions with an analytical component, or problems based on the output of statistical software to test your ability to understand and interpret numbers. The coursework will be devoted to replicating the empirical analysis in published articles which we will select at the beginning of the semester. You will prepare a Latex file with a referee report on the article assigned to you (max 3 pages), and a Stata log file with the replication of the main tables and figures in this article. Your referee report must describe the main findings of the article and discuss the possible threats to the validity of the identification strategy and of the conclusions. You will present the

report in one of the final classes of the semester. Depending on the number of students enrolled, you may be asked to work on the tasks above in groups, which I will form at random.

Grading. I grade exams question by question, rather than exam by exam. I have a checklist of items to look for in your answers. I make this checklist explicit in my solutions. You should be able to grade your exam by looking at the solutions. I read answers to each question twice. The first time I read through everyone's answer to get a sense for the overall quality. For example, at times the tools required for solutions are not mastered well because I have not asked my questions well enough. I want to take this into account by reading all solutions first. The second time, I grade using the checklist. I start with what I think was the best answer after my first reading and read through all exams. I do this to make sure that I appropriately differentiated quality in the first round. Once all answers are graded, I read again your exam and look for the overall control you have over the subject matter of each the question. At the end of this process, I assign grades following the UMD's official marking system. The standards for letter grades are as follows:

- A+, A, A- denote excellent mastery of the subject and outstanding scholarship.
- B+, B, B- denote good mastery of the subject and good scholarship.
- C+, C, C- denote acceptable mastery of the subject.
- D+, D, D- denote borderline understanding of the subject, marginal performance, and it does not represent satisfactory progress toward a degree.
- F denotes failure to understand the subject and unsatisfactory performance.

My assignments and exams are graded on a point scale (out of 30). I use the following scale to relate percentage scores to letter grades:

- A+ 100%-98%.
- A 97%-94%.
- A- 93%-90%.
- B+ 89%-85%.
- B 84%-80%.
- B- 79%-75%.
- F 74% or below.

2.7 Important Dates

First class: August 29, 2023.

Last class: December 5, 2023.

Midterm exam: October 17, 2023.

Coursework and presentation: you should expect to present in early December, depending on how the discussion in lectures unfolds; you should expect a deadline at the end of November for completing your report and replication files. These deadlines depend on the number of students enrolled.

3. Course Related Policies

3.1 Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <https://studentconduct.umd.edu/>.

3.2 Honor Pledge

To promote academic honesty on campus you will be asked by your course instructors to write by hand and sign the following pledge on every examination, paper or other academic exercise. Writing this pledge will serve as a reminder of your commitment to academic integrity.

“I pledge on my honor that I have not given or received any unauthorized assistance on this examination.”

3.3 CourseEvalUM

Your participation in the evaluation of courses through CourseEvalUM is a responsibility you hold as a student member of our academic community. Your feedback is confidential and important to the improvement of teaching and learning at the University as well as to the tenure and promotion process. You can go directly to the website (www.courseevalum.umd.edu) to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing the summary reports for thousands of courses online at Testudo.

3.4 Absences and Other Matters

The University policy regarding attendance and other matters can be found at <https://gradschool.umd.edu/faculty-and-staff/course-related-policies>. The University states that

“An excused absence is an absence for which the student has the right to receive, and the instructor has the responsibility to provide, academic accommodation. Students are expected to take full responsibility for their own academic work and progress. Students, to progress satisfactorily, must meet all of the requirements of each course for which they are registered. Students are expected to attend classes regularly. Consistent attendance offers students the most effective opportunity to gain command of course concepts and materials. Excused absences must be requested promptly and must be supported by appropriate documentation. Excused absences do not alter the academic requirements for the course”. Under the policy, the student must notify the instructor in a timely manner. The notification should be provided either prior to the absence or as soon afterwards as possible. A template for a self-signed note for medical excused absence is available [here](#).

3.5 Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit <http://go.umd.edu/basic-needs> for information about resources the campus offers you and let me know if I can help in any way.