# Gerald R Ford School of Public Policy

# University of Michigan

# Public Policy 639: Program Evaluation

**Winter 2023**

Tu/Th 10:00am-11:20am

Weill Hall 1110

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Office Hours: Mondays 11:30-12:30 and Wednesdays 1:30-2:30pm

Alton Worthington, lecturer at the Ford School, also offers open office hours to Ford School students with questions about Stata/R or other statistical software. You can sign up here: <https://calendar.google.com/calendar/u/0/selfsched?sstoken=UUdlVXNtYm5WcXJmfGRlZmF1bHR8NGYyODRlZTI4MmE2NjBjYzM3Mzc4YTAyMTAxNmNjNzI>

Class materials are located on Canvas

# Required text:

Stock, James H. and Mark W. Watson. 2015. Introduction to Econometrics. Boston: Addison-Wesley. Any edition is fine, provided you read the correct material. I will be referencing the sections in the Updated 3rd edition.

Angrist, Josh. And Jorn-Steffen Pischke. 2016. Mastering ‘Metrics: The Path from Cause to Effect. Princeton, NJ: Princeton University Press.

Required software: Stata (any version will do) or R. Students may purchase a personal copy of the software from the Stata website: <https://www.stata.com/order/new/edu/gradplans/student-pricing/>. You can also access Stata via the remote desktop, but I would strongly encourage you to obtain your own copy of Stata or R. R is free to download.

# Prerequisites:

PubPol 529 or equivalent introduction to statistics course

# Course Objectives and Description

 This course builds on the material presented in PubPol 529. **Program evaluation** is the field of study designed to estimate the efficacy of a program, policy, or some other intervention or “treatment.” This course aims to equip you with the statistical tools and reasoning necessary to produce solid empirical investigations of a variety of programs/policies as well as to read the evaluations of others critically. With the availability of statistical software and Excel, it’s very easy to produce empirical research. What is more difficult is evaluating the *quality* of the findings and producing good and convincing empirical research. This class will help you learn to produce your own empirical research as well as become a critical consumer of empirical research. Regardless of where you find yourself after Maxwell, the tools we develop in this course are designed to serve you well whether you go into non-profit management, research, private sector, or government.

Most classes will consist of lectures with examples. This is not a mathematical statistics course. We will focus on “real world” applications, i.e., use examples similar to the ones you may come across once you leave graduate school. The primary text (Stock and Watson) has a variety of outstanding examples. In addition, I will also draw on examples discussed in *Mastering ‘Metrics: The path from cause to effect*. This text is less technical and provides lots of real-world examples that you may find relevant to your own interests.[[1]](#footnote-1)

My goal in the lecture is to highlight and explain the material that I believe is important rather than walk through each section of the textbook. Students will also gain some insight into the material that I believe is most important with the problem sets. Students should not, however, interpret the absence of a topic from lectures or problem sets (a topic that is, however, mentioned in the assigned readings) as unimportant information. In that vein, we cannot cover all of the relevant material in class. The homework assignments are designed to deepen your understanding of the material we discuss in class.

# Grading Components

*Class Participation*

Class participation will be worth 10% of your grade and will be based on your active participation in class and submitting “statistics in the wild” examples on blackboard. On the course Canvas page, there is a discussion board specifically for statistics in the wild—feel free to post links to examples of bad statistics (bad graphics, examples of articles that conflate correlation and causation, etc.) or good examples of graphics or stories with some relation to topics we’ve discussed in class. Post at least **five links** at some point during the semester. I will select a couple of examples per week to share in class. Finally, I expect you to come to class and actively participate and that you will inform your instructor if you are unable to attend class for any reason.

*Homework*

There will be five problem sets during the semester. To allow students to plan ahead, *tentative* due dates are posted in this syllabus. If there is a change in the final due date, students will be given notice at least one week in advance of the new due date. Completed assignments should be turned in via the appropriate folders via **Canvas by 11:59pm on the given due date.**

**Homework that is late will NOT be accepted.** Solutions to the problem sets are posted on Canvas after the deadline.

Students are allowed to work in small groups to discuss the problems and develop solutions together. HOWEVER, each student must write-up the solutions that he/she submits independently. Failure to write-up your solutions independently will be considered a breach of the academic integrity policy.

These problem sets will be graded on a check/check plus/check minus scale, based on competent completion. You will lose a point if (a) you skip *any* portion of *any* problem or (b) fewer than 60% of problems are answered correctly. Since these scores will not provide a detailed sense of your understanding of the material, you will want to make use of answer keys posted online to assess your performance along the way.

**The lowest grade on your homework assignments will be dropped.**

Assignment #1 due **Thursday**, January 19th, 2023

Assignment #2 due Friday, February 3rd, 2023

Assignment #3 due Friday, February 17th, 2023

Assignment #4 due Friday, March 17th, 2023

Assignment #5 due Friday, March 31st, 2023

*Program Evaluation Critiques*

As part of your development as a critic of statistical analysis, you will be required to read two academic articles (several options will be provided by the instructor) and write a brief (2 page) critique of them. The report should summarize the findings of the article and outline the strengths and weaknesses of the analysis (see assignment sheet on Canvas for more details). You may discuss the assigned articles with your classmates but the reports must be written up entirely independently. **Due on the last day of class: Tuesday, April 18th, 2023 at 11:59pm via Canvas.**

*Exams*

There will be two exams: a midterm and a final. The midterm will be taken in-class on **Thursday, February 23rd, 2023** and will reflect the material covered in the first half of the semester. The final will focus on the material in the second half of the semester and be taken during the scheduled final exam time for our class time, which is **Monday,** **April 24, 2023 4-6pm**. You can bring one “cheat sheet”, a 8.5x11” sheet of paper with notes (front and back, typed or written) to each exam.

**Ford School Inclusivity Statement:** Members of the Ford School community represent a rich variety of backgrounds and perspectives. We are committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

* share their unique experiences, values and beliefs
* be open to the views of others
* honor the uniqueness of their colleagues
* appreciate the opportunity that we have to learn from each other in this community
* value one another’s opinions and communicate in a respectful manner
* keep confidential discussions that the community has of a personal (or professional) nature
* use this opportunity together to discuss ways in which we can create an inclusive environment in Ford classes and across the UM community

**Ford School Public Health Protection Policy:** In order to participate in any in-person aspects of this course--including meeting with other students to study or work on a team project--you must follow all the public health safety measures and policies put in place by the State of Michigan, Washtenaw County, the University of Michigan, and the Ford School. Up to date information on U-M policies can be found [here](https://campusblueprint.umich.edu/). It is expected that you will protect and enhance the health of everyone in the Ford School community by staying home and following self-isolation guidelines if you are experiencing any symptoms of COVID-19

**Student Mental Health and Wellbeing:** The University of Michigan is committed to advancing the mental health and wellbeing of its students.  We acknowledge that a variety of issues, both those relating to the pandemic and other issues such as strained relationships, increased anxiety, alcohol/drug problems, and depression, can directly impact students’ academic performance and overall wellbeing. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available.

You may access counselors and urgent services at [Counseling and Psychological Services](https://caps.umich.edu/) (CAPS) and/or [University Health Service](https://www.uhs.umich.edu/mentalhealthsvcs) (UHS).  Students may also use the Crisis Text Line (text '4UMICH' to 741741) to be connected to a trained crisis volunteer.  You can find additional resources both on and off campus through the [University Health Service](https://uhs.umich.edu/stressresources) and through [CAPS](https://caps.umich.edu/article/um-mental-health-resources).

**Accommodations for Students with Disabilities:** If you believe you need an accommodation for a disability, please reach out to U-M [Services for Students with Disabilities (SSD)](https://ssd.umich.edu/) office to help determine appropriate academic accommodations and how to communicate about your accommodations with your professors. Any information you provide will be treated as private and confidential.

## Academic Integrity: The Ford School academic community, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. We hold all members of our community to high standards of scholarship and integrity. To accomplish its mission of providing an optimal educational environment and developing leaders of society, the Ford School promotes the assumption of personal responsibility and integrity and prohibits all forms of academic dishonesty, plagiarism and misconduct. Academic dishonesty may be understood as any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community. Plagiarism involves representing the words, ideas, or work of others as one’s own in writing or presentations, and failing to give full and proper credit to the original source. Conduct, without regard to motive, that violates the academic integrity and ethical standards will result in serious consequences and disciplinary action. The Ford School's policy of academic integrity can be found in the [MPP/MPA,](https://www.dropbox.com/s/oxbgig3kw5dwjzy/FINAL%202022%20Masters%20Handbook.pdf?dl=0) [BA](https://www.dropbox.com/s/i3eiituwsblsncc/FINAL%202022%20BA%20Handbook.pdf?dl=0), and [PhD Program](https://www.dropbox.com/s/31d5lihoviiloqs/FINAL%202022%20PhD%20Handbook.pdf?dl=0) handbooks. Additional information regarding academic dishonesty, plagiarism and misconduct and their consequences is available at: <http://www.rackham.umich.edu/current-students/policies/academic-policies/section11#112>

## Use of Technology: All course materials (including slides, assignments, handouts, pre-recorded lectures or recordings of class) are to be considered confidential material and are not to be shared in full or part with anyone outside of the course participants. Likewise, your own personal recording (audio or video) of your classes or office hour sessions is allowed only with the express written permission of your instructor.  If you wish to post course materials or photographs/videos of classmates or your instructor to third-party sites (e.g. social media), you must first have informed consent. Without explicit permission from the instructor and in some cases your classmates, the public distribution or posting of any photos, audio/video recordings or pre-recordings from class, discussion section or office hours, even if you have permission to record, is not allowed and could be considered academic misconduct.

**Please review additional information and policies regarding academic expectations and resources at the Ford School of Public Policy at:** [**https://intranet.fordschool.umich.edu/academic-expectations**](https://intranet.fordschool.umich.edu/academic-expectations)

# Make Up Work

Students are expected to complete all assignments by the deadline. Other than the exception for religious observance noted above, make-up homework assignments and exams will **not** be given under any circumstances. Students who fail to turn in an assignment before the deadline or take an exam will receive a grade of zero for that course requirement.

# Computing

Much of the homework assignments will be done on a computer using Stata or R. Please do not simply hand in output from the Stata/R program. Instead, please paste the relevant results into a word processor adding text to explain these results.

# Grading

Class Participation 10%

Homework 25%

Program evaluation critiques 15%

Midterm 20%

Final exam 30%

# Topics

The course will be divided into three parts. In Part I, we will discuss causal inference as distinct from statistical inference and contrast evidence from observational data with that from randomized trials (experiments). In Part II, we will develop the core analytic tool of linear regression. We will discuss single and multi-variable regression models, hypothesis testing, dummy variables, heteroscedasticity, model fit, multicollinearity, joint hypothesis testing, and transformations. This will comprise the middle 8 weeks of the course. Part III introduces fixed effects and panel data, as well as quasi-experimental methods such as differences-in-differences, event study, and regression discontinuity models. These are all techniques designed to control for unobserved factors that may confound the estimates from linear regression.

# Tentative Schedule

**Part I: Causal Inference and Randomized Controlled Trials**

**1/5: Course Overview and Expectations**

*Readings:* S&W Chapter 1

**1/10: Introduction to Causal Inference**

*Readings:* A&P Introduction and Chapter 1

Carroll, Aaron. Workplace Wellness Programs Don’t Work Well. Why Some Studies Show Otherwise. <https://www.nytimes.com/2018/08/06/upshot/employer-wellness-programs-randomized-trials.html?smid=tw-upshotnyt&smtyp=cur>

**1/12: Randomized Controlled Trials I**

*Readings:* A&P Chapter 1 (cont.); S&W Chapters 2-3; (should mostly be review from PubPol529)

**1/17: Randomized Controlled Trials II**

*Readings:* Bertrand and Mullainathan, 2004. “Are Emily and Greg More Employable than Lakisha and Jamal? Evidence on Racial Discrimination in the Labor Market from a Large Randomized Experiment,” September 2004, *American Economic Review.*

Sendhil Mullainathan 2019. Biased algorithms are easier to fix than biased people. *New York Times.* <https://www.nytimes.com/2019/12/06/business/algorithm-bias-fix.html>

# Part II: Regression Analysis

# 1/19, 1/24: Bivariate regression

*Reading*: S&W Ch. 4.1-4.4, Appendix 4.1; Ch. 4.5, 5.1-5.2

## Assignment #1 due January 19th at 11:59pm

**1/26: Measures of fit, Heteroskedasticity, and categorical variables**

*Readings:* S&W Ch. 5.3, 5.4

# 1/31, 2/2: Multiple Regression

*Readings:* S&W Ch. 6.1-6.6; A&P Ch.2

## Assignment #2 due Friday, February 3, 2023 at 11:59pm

**2/7, 2/9: Omitted Variable Bias and hypothesis testing in multiple regression**

*Readings:* S&W Ch. 6.1-6.6 & Ch. 7

**2/14, 2/16: Multiple categorical variables and multicollinearity; Start non-linearities: polynomials**

*Readings:* S&W Ch. 6.7, begin Ch 8.1-8.2

## Assignment #3 due Friday, February 17th , 2023 at 11:59pm

# 2/21: Review for Midterm

**2/23: Midterm (in-class)**

# 3/7, 3/9: Introduction to non-linearity: polynomials and logs; interaction terms

*Readings:* S&W Ch. 8.1-8.5

Butsic, V., Hanak, E. and Valletta, R.G., 2011. Climate change and housing prices: Hedonic estimates for ski resorts in western North America. *Land Economics*, *87*(1), pp.75-91.

**3/14, 3/16: Binary dependent variables: linear probability models, probit, logit**

*Readings:* S&W Ch. 11.1-11.5

Munnell, A.H., Tootell, G.M., Browne, L.E. and McEneaney, J., 1996. Mortgage lending in Boston: Interpreting HMDA data. *The American Economic Review*, pp.25-53.

## Assignment #4 due Friday, March 17th at 11:59pm

**Part III: Panel data, fixed effects, and quasi-experimental techniques**

# 3/21, 3/23: Panel Data and fixed effects

*Readings:* S&W Ch. 10

Currie, Janet and Duncan Thomas, (1995). “Does Head Start Make a Difference?” *American Economic Review* 85(3): 341-364.

# 3/28: Introduction to quasi-experiments: Difference-in-differences analysis

*Readings*: A&P Ch. 5 (This topic is also briefly discussed in S&W Ch. 13.4)

Card and Krueger, 1994. "Minimum Wages and Employment: A Case Study of the Fast Food Industry in New Jersey and Pennsylvania." *American Economic Review* 84 (September 1994).

**3/30: Partial Compliance in RCTs and Instrumental Variables**

*Readings:* A&P Ch. 3.1 (The Charter Conundrum)

## Assignment #5 due March 31st at 11:59pm

**4/4: Guest lecture by Professor Natasha Pilkauskas**

*Readings:* Pilkauskas, N., Michelmore, K., Kovski, N. and Shaefer, H.L., 2022. *The effects of income on the economic wellbeing of families with low incomes: Evidence from the 2021 expanded Child Tax Credit* (No. w30533). National Bureau of Economic Research.

**4/6: Quasi-experiments continued: Regression Discontinuity Design**

*Readings*: A&P Ch. 4(This topic is also briefly discussed in S&W Ch. 13.4)

Cohodes, Sarah R., & Goodman, Joshua S. 2014. Merit aid, college quality, and college completion: Massachusetts' Adams scholarship as an in-kind subsidy. *American Economic Journal: Applied Economics*, *6*(4), 251-285.

**4/11: Regression Discontinuity, cont.**

*Readings:* Listen to podcast: <https://www.probablecausation.com/podcasts/episode-12-michael-lovenheim>

**4/13: Internal vs external validity**

*Readings*: S&W Ch. 9, 13.1, 13.2, 13.5, 13.6

**4/18: In-class discussion of probable causation podcast**

**Before class:** Listen to **one** of the following podcasts from Probably Causation podcast and **read the accompanying paper** (all posted on Canvas) We will spend the bulk of class discussing the episodes:

1. Manasi Deshpande on how to access to welfare affects criminal behavior (Regression Discontinuity):

<https://www.probablecausation.com/podcasts/episode-72-manasi-deshpande>

1. Elizabeth Linos, on reducing burnout among 911 dispatchers (Randomized Controlled Trial):

<https://www.probablecausation.com/podcasts/episode-77-elizabeth-linos>

1. Kirabo Jackson, on single-sex education and teen arrests and motherhood (Regression Discontinuity):

<https://www.probablecausation.com/podcasts/episode-26-kirabo-jackson>

1. Thomas Dee, on dispatching health workers instead of police to some 911 calls (Difference in Differences):

<https://www.probablecausation.com/podcasts/episode-80-thomas-dee>

5. Analisa Packham, on syringe exchange programs and opioid use (Difference in Differences):

<https://www.probablecausation.com/podcasts/episode-3-analisa-packham>

## Program Evaluation Critique due Tuesday, April 18th, 2023 at 11:59pm on Canvas

# Final Exam: April 24, 2023 4-6pm

1. Please note that this book is written in a “karate kid” style of a student learning from a Kung Fu master, which some might find problematic. That aside, I believe that the ways in which the authors write about econometrics in a more everyday language might be useful to a lot of students in the course. If you are uncomfortable reading this book, I will also provide suggestions of alternative places to read about these topics. [↑](#footnote-ref-1)