



## Syllabus

### Ph.D. Econometrics III

ECON 7175-01 (CRN: 58544)

3 credit hours

Spring 2024

Tuesdays and Thursdays from 3:30-4:45 p.m.

Richardson Building (RB) 200

**Zoom:** <https://tulane.zoom.us/j/99651877799>

**Canvas:** <https://tulane.instructure.com/courses/2277918>

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*(Basement of the library, NOT in Tilton Hall.)*

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## Course Description and Objectives

This course builds somewhat on the content of Ph.D. Econometrics I, and II - that latter of which is taught concurrently. This course covers methodologies that would be in the “toolbox” of any researcher doing causal inference research (and does not exclusively do randomized control trials). These include regression control, instrumental variables, experiments, panel data methods, difference-in-differences, event studies, synthetic control case studies, regression discontinuity design, and propensity score matching.

This course also covers key topics and tools used by applied microeconomists - those using data to study more micro-economic oriented topics in fields such as, but not limited to, labor, public, development, health, and urban economics. But even if you do not fall into these categories, such as being more focused on finance, macro, or other social sciences (and without a focus on causal inference), then several of the course concepts and modules will still be relevant. These include as binary dependent variables, weighting, bootstrapping, and panel data. This course will summarize the basic theory (without proofs) and will focus on applications (using Stata) and best practices. The ultimate goals of the course are helping students be problem solvers when it comes to determining how to analyze data in the “real world”, and helping students develop research ideas and methodologies on causal inference topics.

## Prerequisites and Co-Requisites

For those in the Economics Ph.D. program, the prerequisite for this course is ECON 7160 (Ph.D. Econometrics I). The co-requisite (should be taken at the same time as this course) for Economics Ph.D. students is ECON 7170 (Ph.D. Econometrics II).

If you would like to take this course but are outside the Economics Ph.D. program then please contact me, if you have not already, so we can discuss. Generally, I let some students into this course that have an econometrics or statistics background and are looking to learn more about policy analysis. This includes, for example, some M.A. in Economics students or exceptional undergraduates, and Ph.D. students in other fields, including, but not limited to, Accounting, Business, Finance, Political Science, Public Health, Aging, and Sociology.

For those not in the Economics Ph.D. program, the prerequisite is at least one, but ideally more than one, course on econometrics or regression analysis. Students who are not in the Economics Ph.D. program are not required to also register in ECON 7170 (Ph.D. Econometrics II). My course has some overlap in content but taking that course at the same time is optional (and would require permission of the instructor). These students also do not require the usual “prerequisite” of ECON 7160 (Ph.D. Econometrics I).

In this course I will assume that you have good exposure to linear regression and related statistical methods. The methodologies I will cover will build off of this. Those who have difficulty understanding basic concepts such as hypothesis testing, regression coefficients, standard errors, asymptotics, and maximum likelihood, will need to brush up on these concepts as you will fall behind in your understanding if you do not understand these basics. Please ask for help if you feel like you’re getting too lost (some amount of

being lost is normal, since econometrics courses are always difficult). The first quiz and first assignment are good tests of how you are doing in the course.

## Program Outcomes

This course is fundamental to the Economics Ph.D. program. Almost all of you will do at least some applied microeconometrics or causal inference - which is what this course focuses on. Almost all students write empirical papers as a part of their dissertation, and they often use one or more of the techniques I will be teaching you in this class - usually some flavor of differences-in-differences. But even if you are doing data analysis that focuses more on macro or other applications, much of the course will still be useful given how practical it is.

I will also be introducing you to how to use Stata. While R is also great, using Stata is more common for those doing applied microeconometrics and for economists doing causal inference. So, it is likely very important to learn Stata regardless of if you know R or plan to focus on learning R. (Somewhat regrettably, I only know Stata.) As you focus more on your own research, you will determine if you prefer to work in Stata, R, or perhaps something else.

## Learning Outcomes

After completing this course, students will be able to...

### - Regression Control

- Explain the pitfalls of the “Kitchen Sink” regression approach.
- Explain how omitted variables can bias OLS estimates.
- Explain how measurement error can bias OLS estimates.
- Explain how simultaneity makes it difficult to estimate causal effects or isolate demand or supply curve.
- “Sign” the bias from omitted variables, measurement error, and simultaneity in an example.

### - Standard Errors and Weighting

- Explain why “robust” standard errors are more realistic than “raw” standard errors.
- Estimate robust standard errors and clustered standard errors in Stata (extremely easy).
- Argue what asymptotic assumptions are necessary to estimate standard errors, and how bootstrapping gets around this.
- Explain bootstrapping intuitively to senior undergraduates taking econometrics.
- Apply bootstrapping using Stata or R.

- Explain why Monte Carlo experiments are useful to compare methodologies.
- Explain the concept of a cluster and how it affects the estimation of standard errors.
- Discuss when weighting a regression (using survey weights) is appropriate and when it may not be (as per [Solon et al. \(2015\)](#)).
- Estimate weighted and unweighted means and regressions in Stata.
- **Instrumental Variables**
  - Explain how IV is a possible solution to omitted variables, endogeneity, and measurement error.
  - Explain the identifying assumptions of IV and what happens when they are violated.
  - Explain what happens when instruments are weak.
  - Explain why IV may be necessary in the context of the classical experiment.
  - Explain the concept of non-compliance and the local average treatment effect (LATE).
  - Identify instruments as either “good” or “bad” based on if they violate the IV assumptions, are weak, or provide LATE estimates without external validity.
  - Run IV and two-stage least squares (2SLS) in Stata (see [Nichols \(2007\)](#)).
  - Conduct tests of weak instruments and over-identification tests and explain why they are important.
  - Explain reasons why the IV/2SLS estimates and the OLS estimates may differ (e.g., bias, measurement error, LATE).
- **Experiments**
  - Explain how experiments generate unbiased estimates and avoid the earlier problems that plague regression control.
  - Explain how compliance affects the estimation of treatment effects.
  - Explain what must be done in situations of imperfect compliance.
  - Contrast "intent-to-treat" (ITT) and "treatment-on-the-treated" (TOT) estimates. What do they measure and how are they related?
  - Explain why it is necessary to show that baseline characteristics are the same for the treatment and control groups.
  - Assess the external validity of an experiment (e.g., field experiment vs. lab experiment)
- **Difference-in-Differences**
  - Explain what panel data is and why it is useful.
  - Assess whether fixed effects or random effect is more appropriate, appealing largely to arguments about omitted variables.

- Determine which controls would not be required (i.e. they drop out) when first differences or fixed effects are used.
  - Contrast the first difference and fixed effects.
  - Explain concepts like “within-group variation”
  - Explain a simple difference-in-differences to my undergraduate students (it’s possible and not hard) using a 2 by 2 grid, an intuitive explanation, and an example.
  - Explain intuitively, and using an example, what variation fixed effects control for and what variation time effects control for.
  - Explain what variation is not controlled for under a DiD or DiDiD and what possible variation or shocks remain as threats to the casual estimate.
  - Explain a DiDiD, including what two-way fixed effects capture.
  - Assess to what extent policies analyzed in a DiD or DiDiD could be endogenous, and discuss how the sign could be signed.
  - Understand why standard errors should be clustered at the level of policy variation, and what happens when you don’t do this, i.e. [Bertrand et al. \(2004\)](#) and [Moulton \(1990\)](#).
  - Understand why the above clustering is a poor approach with few treated units (i.e. [Cameron et al. \(2008\)](#), [Conley and Taber \(2011\)](#)).
  - Explain what two-way or multi-way clustering is (i.e. [Cameron et al. \(2011\)](#)).
  - Explain what time trends are and why they are fundamental to DiD studies.
  - Explain the “Parallel Paths” assumption, and the weaker assumptions such as “Parallel Growth” (as in [Mora and Reggio \(2019\)](#)).
  - Speculate, using an example (e.g., [Acemoglu and Angrist \(2001\)](#)) if there are likely to be time trends that are differential for the treatment and control groups.
  - Estimate DiD and DiDiD models in Stata both with and without time trends.
  - Assess if there appear to be time trends in aggregate by creating an event study figure.
  - Assess if treatment effects would appear in levels or in growth rates, and if time trends would attenuate estimates or not (see [Meer and West \(2016\)](#)).
  - Explain how the average DiD estimate is a weighted combination of all different group-period estimates.
  - Describe and explain the staggered DiD model.
  - Estimate a staggered DiD model and interpret the output.
  - Summarize the concerns, take-aways, and proposed solutions from key papers in the recent differences-in-differences econometrics literature, such as ([Gardner, 2021](#)), ([Sun and Abraham, 2021](#)), and ([Goodman-Bacon, 2021](#)).
- Synthetic Control Case Studies**

- Explain the “synthetic control” approach in an intuitive way to undergraduate students (it’s possible).
  - Explain how the control group (synthetic control) is constructed.
  - Understand how inference is done with this technique.
  - Explain how the control group under synthetic control differs from the control group under panel DiD.
  - Discuss how the methodology has evolved since the seminal [Abadie et al. \(2010\)](#) paper (e.g., how to deal with covariates, how to better construct control groups, how to better deal with multiple outcomes, how to incorporate more than one treated group).
- Regression Discontinuity Design**
- Explain the difference between a “sharp” and a “fuzzy” RD.
  - Explain how the treatment effects estimated with RD are “local” (i.e. local average treatment effect, or LATE)
  - Contrast RD with an actual experiment, explaining how it is similar and what assumptions are necessary for to to be similar.
  - Estimate a discontinuity in Stata using the most up-to-date non-parametric methods
  - Test for possible manipulation of the assignment variable using the [McCrary \(2008\)](#) or [Frandsen \(2017\)](#) density test, along with testing the continuity of covariates.
  - Explain other issues with the assignment variable, such as heaping-bias ([Barreca et al., 2016](#)) and rounding errors ([Dong, 2015](#)).
- Propensity Score Matching**
- Understand intuitively how p-score matching works.
  - Understand which Stata program(s) could be used to conduct p-score matching in Stata.
  - Discuss to what extent p-score provides causal estimates.
- Other Learning Outcomes**
- Describe the general structure of empirical research papers.
  - List some of the “Ten Commandments of Applied Econometrics”.
  - Understand at least two issues with survey data, such as item non-response, seam bias, attrition, mis-reporting, etc.
  - Explain to undergraduates the fundamental problem of causal inference.
  - Read applied econometrics and causal inference papers more efficiently.
  - Seek out, accept, and incorporate feedback on research ideas and writing, and make revisions to improve.

- Provide constructive feedback on, and ask questions about, the research of others, especially your peers.
- Use Stata to conduct regression analysis and causal inference, especially differences-in-differences and related methodologies.
- Better motivate research ideas to get a reader or listener interested in the idea and its potential contributions.
- Identify gaps in the literature that your research idea could fill.
- Articulate the policy or societal impacts of your research ideas to a general economics or social science audience.

## Required and Recommended Books, Readings, and Software

### Required Books

The first required book is:

Cunningham, Scott. 2021. *Causal Inference: The Mixtape*. New Haven, CT: Yale University Press

In the [list of readings below](#), I refer to this as “**Mixtape**”. You should read the whole thing eventually, but I indicated in the [readings section below](#) which parts of this correspond to which content in the course.

The second required book is:

Angrist, Joshua D., and Jorn-Steffen Pischke. 2015. *Mastering 'Metrics: The Path from Cause to Effect*. Princeton, NJ: Princeton University Press

In the [list of readings below](#), I refer to this book as **MM**. MM is technically a book for undergraduates but it's very useful for you to learn the basics and intuition behind causal inference techniques. It's important to have this basis of understanding as we will then get more technical, either through the other books and often through peer-reviewed journal articles. The intuition is far more important than the matrix algebra and the proofs.

The third required book is luckily a free PDF. This is:

Nichols, Austin. 2009. *Casual Inference: Measuring the Effect of X on Y*. <http://pped.org/cimexy.pdf>

In the [list of readings below](#), I refer to this as “**Causal Inference**”. You should read the whole thing eventually, but I indicated [below](#) which parts of this correspond to which content in the course.



## Highly Recommended Books

I also recommend that you purchase, borrow, or have access to:

Angrist, Joshua D., and Jorn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press

In the list of readings [below](#), I refer to this book as **MHE**. MM is a less technical a follow-up to MHE. I suggest you read or at least skim MHE in addition to MM. Generally, the Mixtape is a more updated and practical version of MHE, so I would consider MHE is be supplementary. MHE used to be the standard until the Mixtape was published.

## Useful Reference Books

In addition the following books are also helpful for reference and are useful for all graduate students to have access to in some form:

Greene, William. *Econometric Analysis*. Prentice Hall.

Kennedy, Peter. *A Guide to Econometrics*. Wiley-Blackwell.

Wooldridge, Jeffrey. *Econometric Analysis of Cross-Section and Panel Data*. MIT Press.

Some of these books have multiple editions. It's not crucial to buy the most recent edition (I have out of date versions). If you can't access a newer edition, my suggestion is to buy a used copy, perhaps an older edition, as these are more affordable. I believe that the library has one or more copies of these books as well - but let me know if there are issues with getting these books from the library as I can work with them on that. I don't use Kennedy's book as much as reference but it was a helpful book when I was learning econometrics. The book presents material in a different and intuitive way, and it covers issues you'd face in practice. It is worth a read at some point.

## Required Software - Stata

You will need access to the statistical software Stata. Stata is what most applied econometricians and policy researchers use. Many economists also use R. R has many pros and cons compared to Stata, and ideally you should learn both to some extent. You can then focus on one program (Stata, R, something else) once you are doing research, as certain projects might work best using certain software (e.g., some packages are only written for Stata, or R, and not both).

There are a few options for how you can use Stata:

1. **Economics Ph.D. students only: use our departmental license.** The Department of Economics has a departmental-wide license to Stata, allowing faculty and Ph.D. students in the Department of Economics to download Stata using the license. If you haven't gotten an email from Erin Callhover with information on this license, then please let me know. Unfortunately, this license cannot be used or shared with those other economics faculty or Ph.D. students, per the license agreement.

2. **Buy or rent your own license.** See <https://www.stata.com/order/new/edu/profplus/student-pricing/> for options and pricing. You are probably wondering which version of Stata (BE, SE, or MP) you should get? Probably SE if you are a Ph.D. student or plan to use Stata a bunch. BE is capped out at 2,048 right hand side variables, which is fine for most things, including all assignments in this course, but often you'll hit a snag later on where you can't do something with BE. A common snag is that adding, say, state by year fixed effects can't be done with BE, which rules out some differences-in-differences or differences-in-differences-in-differences models (alternative workaround: sometimes you can use the "absorb" sub-command or "areg"). However, if you have a limited budget then you can get BE and it'll work fine for you most of the time, but you'll have to upgrade later or use Stata on server for that particular project. If you are not a Ph.D. student, or don't think you will use Stata for that long, then BE will be fine and will save you some money. Don't get MP. MP is designed for servers - and if you ever need to use Stata on a server to do work with huge datasets or analysis that's time consuming, then you'd want to use Stata on a server like Cypress (see below).
3. **Access Stata online.** You can do this through Tulane's Stata licenses on "AppsAnywhere" (via <https://software.tulane.edu>). This is free and can generally do everything you need it to. However, it has some downsides. First, I have heard that there are occasional reliability issues. Second, it is harder to use Stata this way since you interface with files through a server, which can be confusing at first. Third, Tulane does not provide tech support specifically for Stata or this program (the tech support you could get would be more general). For more information on this option and tips, see this guide that my RA wrote: <https://bit.ly/StataTulane>.
4. **Access Stata on Cypress.** An alternative to using Stata on "AppsAnywhere" is to use it on Tulane's Cypress server. This is even less convenient and has a worse interface, but runs calculations much faster and has better reliability. I only recommend it for if you have to run time-consuming or difficult regressions later on. E.g., you are running a regression for your research that takes a long time (e.g., maximum likelihood, bootstrapping). For more information on Cypress, see <https://wiki.hpc.tulane.edu/trac/wiki/cypress/about>.

## Learning to Use Stata

I will not be teaching the basics of Stata due to time constraints. I would love to but I really need to provide you with the basics of applied microeconometrics and causal inference. My course already has a lot to cover (it should really be two courses).

If you have no experience with Stata, then you should consider getting or borrowing these books:

Acock, Alan. 2008. *A Gentle Introduction to Stata, 2nd Edition*. Stata Press

A. Colin Cameron, and Pravin K. Trivedi. *Microeconometrics Using Stata, 2nd Edition*. Stata Press

Skimming through those books will be useful to you, even if it's something you do after the course.

There are lots of other resources available for learning Stata on your own. Stata Corp. has a list of excellent web-based tutorials for learning how to use Stata: <https://www.stata.com/teaching-with-stata/> and <https://www.stata.com/links/resources-for-learning-stata>. For example, here are Stata cheat-sheets that are useful for beginners: <https://www.stata.com/bookstore/statacheatsheets.pdf>. There are also useful Stata resources here: <http://www.ats.ucla.edu/stat/Stata/examples/greene/default.htm> and <http://fmwww.bc.edu/gstat/examples/wooldridge/wooldridge.html>. One other *possible* resource to note is that the department does offer a 1-credit hour Stata course for undergraduates, and you could politely contact the instructor to see if you could get resources from the course (e.g., get added to the course's Canvas page, if one exists) or audit the course, but this would be entirely up to them as to if they have the capacity or ability to assist. There are likely many other resources online on how to use Stata that I am not aware of as well. If you find anything useful, please let me know.

## Other Readings

In addition to the textbooks, there will be several other readings, most of which will be peer-reviewed academic journal articles, but sometimes they will be more accessible blog posts or "handouts". All of these readings will be available through Canvas. These readings are also listed below under "[Topics and Readings Outline](#)". However, the most up-to-date listings of which readings are required and when you need to read them will be on Canvas.

As you will see on Canvas, I will make a page under the "Modules" section for each course day. On the page for each course day, I will list which readings should be done before and/or after class. I will also note how important each reading is (e.g., read carefully, skim, optional). As with most graduate courses, more readings are provided than there is time for you to read them, so I will provide some reading guidance on each page under "Modules" so you can better allocate your scarce time. I intentionally provide more readings than you have time to read as I want to provide you with resources you can read later or even now if you want to learn more. For example, if you end up doing, say, a regression discontinuity design paper as a field paper, then you'll want to go beyond what we've covered in this course. Students find this syllabus to be a useful reference later when they need to dig into methodologies more. This is the main reason why I list far more readings in this course than are covered in class or that you are expected to read - more on this is discussed [below in the section "Topics and Readings Outline"](#).

## Evaluation Procedures and Grading

### Grading Scheme

I measure your success at achieving the learning outcomes above through various course assignments and exams. Your final course grade is based on the following:

- Two (2) Quizzes ( $2 \times 15\% = 30\%$ )
- Three (3) Group Assignments ( $6\% + 6\% + 10\% = 22\%$ )
- Cumulative Final Exam (18%)
- Short Research Proposal (20%)
- In-Class and Other Activities (10%).

For those in the course who are not Ph.D. students in economics, it may be beneficial to change this grading scheme. For example, writing a short research proposal might not make sense for you, or perhaps it should be of greater focus over other assessments. It would be useful for me to learn about your background and goals and we can determine to what extent tweaking the assessment or other matters in the course would make sense for you. For those auditing the course, it is up to you as to what you would like to do. Please discuss your plans and thoughts with me, which you can change - just keep me updated, please.

### Converting percentage grades to letter grades

In determining your final letter grade, I will first calculate a percentage grade based on the above criteria. Then I will convert this final percentage grade to a final letter grade as follows:

- A = 93% to 100%, A- = 90% to 92.99%,
- B+ = 87% to 89.99%, B = 83% to 86.99%, B- = 80% to 82.99%,
- F = 0% to 79.99%

(In the rare case that there is an undergraduate in the course, then they can earn a grade between C+ a D- following the usual grade distribution, where a failing grade is instead less than 60% instead. However, I have luckily never had undergraduate students get grades that fell in this range so far.)

Note that I do not round grades up if you are close to a cut-off or otherwise tweak grades (e.g., apply a curve). I would prefer not to add subjectivity into the process as this is not fair. Please do not ask me to do this. Requests of this nature will be ignored. Similarly, I do not provide extra credit opportunities. I design my courses to allow you to revise and resubmit assignments, and I reward you for improvements. This often increases your grade significantly, while also improving your research and writing skills.

Below are more details on each evaluation category.

## Quizzes and the Cumulative Final Exam

### Quizzes

There will be two quizzes, all conducted during class time, using the entire class time. These are scheduled for Feb. 20 and Apr. 2.

I will allow students to take a quiz remotely if they get prior approval from me. (Of course, those taking the course remotely or asynchronously have this approval - email me to coordinate on when you would like to take the quiz if you cannot take it during the usual class time.) If you need to take the quiz at a different time due to illness or another reason, then please let me know in advance if possible. I am happy to work with you, and I can accommodate many requests, including day of requests (e.g., new COVID-19 symptoms), but it is easier if we have more time to plan.

The quizzes can be conducted on Canvas on your computer or you can provide written answers. You could do a bit of both. For example, for some questions you may prefer to write out equations, and thus do that on paper, but you prefer to answer the other questions on your computer. Those taking the quiz in person can just hand in any written answers in addition to submitting their answers on Canvas. Those taking the quiz remotely can upload photos or scans of written answers if they would like.

The quizzes (and final) are open book, which I describe in further detail later. I made these quizzes open book since some of you will not be taking the quizzes in person, and because I believe I can trust everyone to follow the (less restrictive) rules I have set. I think we can all appreciate this extra flexibility. It's also more realistic to have an open book exam, since most tasks in real life are essentially open book. The downside of open book quizzes is that the econometrics comprehensive exam (for economics Ph.D. students) is not open book, so you will want to ensure that you can answer most of the questions without having to rely too much on notes, etc. Note that while I think we all prefer open book, I may change how we conduct quizzes if I have concerns about cheating.

As for the length of the quizzes and how much time you have to complete them, you will have the entire class time to do each quiz. The quizzes will be approximately three or four short answer questions each. In a few cases there may be a multiple choice question or two.

### Cumulative Final Exam

The final exam is cumulative, which means that it covers all the content from the course. You will have three hours to complete the final exam. To make this exam better practice for the econometrics comprehensive exam ("prelim") that the economics Ph.D. students will take later, I intend to use very similar questions - although slightly harder ones. You will get examples of these questions, including previous final exams, quizzes, and my portion of the (related) comprehensive exam (that the Economics Ph.D. students take). Generally, the questions focus on the most important topics and take-aways, such as the [learning outcomes listed above](#). The final exam will follow the same open-book policies as the quizzes.

## “Open Book” Exam Policies, Citation Requirements, and Preventing Plagiarism

The quizzes and the final exam are “open book”. How I define open book in my course is broadly: you can use any textbooks and notes, and you can additionally use anything on your laptop or on the internet. The restrictions to this are:

1. You cannot communicate with anyone else in the class or outside of the class. This of course includes communicating through the internet, using cellphones, or other communication technology.
2. You need to cite any sources you use outside of lecture notes/slides. This includes course textbooks, non-course materials, and websites. To save time, you can keep the references simple and just include minimal information. For course textbooks, you could just cite them like "The SUTVA assumption is... (Mostly Harmless Econometrics, p. 100)". For websites, you could just include the webpage URL, e.g., “OLS estimates are attenuated when there is measurement error (<https://statshub.org/answers>)”. I am not picky. If I can't figure out what your citation is pointing to, and I really need to figure that out, then I will just ask you later.
3. You can use Generative AI tools such as ChatGPT, Consensus, or Elicit, but you must cite them. My suggestion is to cite this following the standards in the [Chicago Manual of Style](#). Something like “ChatGPT, response to "Explain what a differences-in-differences regression is.," OpenAI, March 17, 2024, <https://chat.openai.com/chat>.” would be fine, even without the URL (not sure if you would be able to get one that would point to the chat output). I have not used generative AI to provide answers to causal inference or other statistical questions, but my guess is that it will be hit-or-miss. I expect it to be great for more common questions or questions where there is consensus behind an answer. However, I expect that it will have difficulty with more niche questions or more applied questions, such as many that you will get in this course. If an answer provided by generative AI is not useful, you might find the sources it provides useful, and if, after reviewing those, you may decide to incorporate those into your answer, and then you can just cite those (see above). Even if you don't use any part of the answer from the Generative AI, and just use sources that it finds, my suggestion is just to note your use of the Generative AI when you are writing up your answer to the exam question anyways because I would be interested to know that you used it (I am still learning to what extent these tools are useful myself).
4. If you include a direct quotation from a textbook, paper, website, or from generative AI output, you must cite the source for that, including a page number if it comes from a book or journal article. It is totally fine to do this so long as it is a relatively short quotation, and then you discuss or explain the quotation. Note that it is plagiarism to take a section of text and change some of the words, and then include it in your writing without citing it. If you want to say it in your own words, then that is great, just follow 2. above and cite the source after you put it in your own words.

I appreciate the care and attention that you are all taking here. I know that most of you know these rules and conventions and follow them - thank you for that. I am very happy to answer any questions about this - my goal is to support you and help you learn.

Please note however that any violations of the rules listed above would be violations of the Student Code of Conduct. Breaking these “open book” exam rules, listed above, or otherwise violating the Student Code of Conduct, could result in failing the course, academic probation, or being terminated from the program. See [Code of Academic Conduct](#) and [Code of Student Conduct](#). Where the situation is unintentional - you made an honest mistake that is minor, I can usually work with you to turn it into a learning opportunity that avoids punishment or having to escalate the issue and involve other parties. But when the violation(s) of the Student Code of Conduct are willful, malicious, or repeated, I am aggressive at ensuring I follow Tulane policy to document and submit these cases for review.

## Group Assignments

A fundamental goal of this course is for you to learn how to apply the techniques in class to actual data. This involves using Stata and/or problem-solving. To help achieve these learning outcomes, there will be three group assignments. Not all assignments will have equal weight - the last assignment is more detailed and requires incorporating more material, so it has a weight of 10% rather than 6%, as for the other two assignments.

### Overview of Assignments 1 and 2

The first two assignments will focus on Stata. The first covers summary statistics, weighting, ordinary least squares (OLS), and logit/probit. The second covers panel data and difference-in-differences (DD). I will provide the data and most of the code you will need for these Stata assignments. I will also demonstrate most of the assignments, so you can see how they would be done. For example, I'll discuss the commands and what the output looks like and how you would interpret it. So, the assignments are more guided and are more of an exercise of following along, understanding the basics of Stata in order to get your code to work properly, and importantly, properly understanding the output that Stata provides.

### Overview of Assignment 3

The third assignment will not require Stata but rather will have your group come up with an idea for a differences-in-differences to estimate, and will have you write up short discussions of several aspects of it such as the set up (e.g., data, treatment and control groups) and the assumptions required for it to provide unbiased estimates (e.g., the parallel trends assumption, SUTVA). This assignment acts as a hands-on summary of most of the differences-in-differences course material. Note that there are several options here for the DiD regression or scenario you can use for this assignment:



1. **Come up with a new idea.** This is not required and may be harder, but may be fun as it allows for creativity. I am less interested in it being an excellent or feasible idea so much as you describing the regression and research question clearly, and noting the data briefly but clearly that would be required.
2. **Describe a fictional scenario.** For example, maybe you present a DiD model and research question that you find interesting, or that is similar to one you find in a paper, but the data does not exist (that you know of). This is fine for this assignment, as you can just pretend that the data does exist. Just note that the data doesn't exist (to your knowledge) but describe what the data would need to be or which variables it would need to have for you to estimate the DiD you propose. The purpose of this assignment is more-so to go through the process of thinking through the set-up and assumptions behind DiD, and less-so about coming up with a DiD regression or new research idea. Given this, coming up with a fictional scenario is absolutely appropriate in this case.
3. **Adapt an older DiD.** In this course and otherwise, you will encounter numerous fantastic DiD papers that had an excellent methodology at the time they were published, but now have a dated methodology, such that you could improve on the methodology in one or more ways. One great option would be for you to use one of these for your assignment (citing the paper and anything you use from it, of course). Then you can describe what you might do differently. You could also note perhaps that you'd also use additional new data, or describe what you would do assuming you had more data of a particular type, etc.
4. **Idea based on a group member's short research proposal.** You can use the scenario from a short research proposal (discussed below) for this assignment - just please mention that the idea came from a short research proposal, and specify which one (e.g., Jane Doe's research proposal). That way, I can make that connection and so there are no concerns about plagiarism. This also may allow me to learn more about that research proposal and the feedback provided on this activity could prove useful for the research proposal, and vice-versa.
5. You may come up with other ideas that not neatly fit into any of these categories. Please discuss any ideas with me and I would be glad to help.

### **Group Sizes and Tips for the Assignments**

Groups can be between one and four students, but with the restriction that if the group can have a maximum of two students who are in the economics Ph.D. program. The reason for this is to incentivize interaction between students who are in the economics Ph.D. program and students who are not. Those in the program likely already have established study groups, while those not in the program are looking to establish that. This group size policy provides an incentive to work with students in a different program than you, by allowing the group size to be larger if the group incorporates student(s) from other programs. While I think this group size policy is very flexible, if there is a legitimate need to break these rules



to have a different group size or structure, then please discuss this with me. This may be required if, say, groups form and there happens to be an odd person out who we can then allocate to an existing group.

I recommend not doing these assignments on your own since it will be more work and it may be more efficient to manage your scarce time by collaborating with others on the assignments. Working together can also improve your learning, especially for Assignment 3. However, please make sure that everyone has a solid understanding of all parts of the assignment when it is submitted. E.g., if your group member writes up the answer to a question in the assignment, then you should review their answer to provide feedback on it, and at least be able to understand the question and the answer. For the Stata assignments, you will want to make sure you understand all parts of the code and ideally you will want to ensure that you can run it, even if someone else runs the code to submit it. By making sure you are familiar with all parts of the assignments, it allows you to maximize learning while being more efficient with respect to your time, since the work is spread out more.

### **Submitting the Group Assignments**

You will submit your group assignments on Canvas. The assignment as posted on Canvas will have instructions that indicate which documents you need to submit and how those should be formatted. Please ensure that you include the names of all group members on your submission (e.g., in the word or PDF file that has your answers).

If you did the assignment in a group or two or more students, then you need to first make a group on Canvas to submit the assignment properly so that those in your group get the same grade and feedback from me. To create a group on Canvas, click on the “People” tab on the left, and then look for the tab for the assignment you want to submit (e.g., “Assignment 1”) and click that. You will then see several groups you can join, ranging from 1, 2, up until about 12. Each person in your group will need to add themselves to the same group number (e.g., all join group 4). Once all of you are in the same group number for that assignment, then only one person from that group needs to submit the assignment. Everyone else in that group will see the submission, get my feedback, and get the same grade. You may lose a small amount of points on your assignments if you do not submit correctly, since it creates hassle for everyone, so please follow these steps and let me know if there are any questions or difficulties.

### **Short Research Proposal**

The short research proposal will have you write up an early-stage proposal or “pitch” for a research study you may want to do. It must involve causal inference (preferably), such as a proposal to study the effect of some X on some Y, or involve data analysis using regression analysis or similar methods. A research proposal for a descriptive paper - a type of paper which analyzes data to present trends but does not try to estimate a causal relationship - would work too in some cases, but please discuss this with me. While causal inference studies are usually more impactful and make better job market papers, sometimes descriptive studies are necessary to do for new data sets before doing any causal

inference studies. Descriptive papers can also be useful and showing a broader picture, or sometimes they are just the only work that is possible on a topic due to data restrictions.

The goals of this short research proposal are:

1. to develop the skill of generating and improving research ideas;
2. to develop skills in academic and economic/policy writing; and,
3. to (ideally) develop a useful research idea that could get you started with empirical / causal inference / policy research.

### Length and Formatting Requirements

The research proposal is “short” since it is a maximum of 1,000 words (and a minimum of 500 words, but likely you will want to get closer to the maximum). This word count is only for the main text, and the word count excludes the references section and the title, your name, page numbers in the margins (e.g., “Page X of Y”), and the word count for the main text (e.g., “Word Count: 988”) (please include all of these). 1,000 corresponds to between three and four double-spaced pages.

For formatting, please use double-spacing, except for references, which should be single-spaced. Please use 12 point font, and a typical/legible font such as Times New Roman, Arial, Calibri, Computer Modern, or [Atkinson Hyperlegible](#). Margins should be at least one inch on all sides. For economics students, please format your references section using the [Chicago Author-Date system](#), which is what is used in economics and many other fields. If you are not an economics student, then please use whatever citation style is used in your field or use Chicago Author-Date. If you need help making a references section, and online resources are not helping enough, then please contact the librarians at the Howard-Tilton Memorial Library as they have training and resources on this and are very helpful.

I highly recommend that you do not make your references section manually. I would recommend using a tool such as Zotero to help with this. For more information on Zotero, see: [. I will also show you Zotero during class.](#) Zotero integrates well with Word and  $\LaTeX$  to allow you to create references sections automatically from references that are in your Zotero database. For those using Microsoft Word or most other word processors, Zotero should already have plugins installed that allow you to create references sections in those programs. See [https://www.zotero.org/support/word\\_processor\\_plugin\\_installation](https://www.zotero.org/support/word_processor_plugin_installation). Those using  $\LaTeX$  can [use these template and BibTeX files from the American Economic Association](#) to make your references section using Chicago Author-Date, following the style in *American Economic Review*. Zotero can create and keep updated a “library.bib” file for you with all your references in your Zotero database, which allows you to make references sections easily based on whichever “.bst” file you use (e.g., aea.bst, downloaded here: <https://www.aeaweb.org/journals/policies/templates>).

As for how to organize your short proposal, please start with your name and a title. The title should not be something like just “Research Proposal” - the title should describe the research idea - see the titles of the journal articles on this syllabus for ideas of what I am looking for here. Then, include your main text (up to 1,000 words). You can break

this text into sections if you want, such as “Introduction”, “Data”, and “Methodology”. I recommend this but it is optional. Please include the references section at the end, unless you are a non-economics student and are using a citation style that provides references in a different way. I will provide examples of short research proposals (or similar writing) on Canvas.

### Grading and Rubric

I will grade your research proposal using a rubric, which is out of ten (10) points. You can find the rubric on Canvas - it will be linked to in several places, including in the assignment itself. The rubric has two (2) points each for:

1. **Content.** This centers on the central idea of your proposal. Is your idea clear, and is your discussion, your sources, etc., focused towards building your central idea?
2. **Policy Implications.** This centers on if you can convince a general economist (or social science, public health, academic) audience that your research idea could be important and is worth studying.
3. **Contribution.** This centers on if you can identify a “gap” in the research literature or a lack of knowledge in a particular area that could be potentially filled by your proposed research.
4. **Feasibility.** This criteria is about if you can convince the reader that this proposed research might be feasible - feasible enough that the proposed research should not be ruled out at this stage because there is an identifiable reason why it would not be possible under reasonable circumstances.
5. **Grammar and References.** This is usually an easy way to get points. But it is very important that readers can make sense of your writing, and that it is possible to determine the sources for what you reference.

After you submit the research proposal, I will give you a score out of two on each category, and I will provide detailed notes as to why you got each score, and what you could do to improve your research proposal.

It is of course unlikely that you will be able to do an excellent job at all these criteria in such a short period of time, and given the 1,000 word constraint, and given how early you are in your graduate program. I will push you to improve but I am not grading this as if I am expecting you to produce a proposal for a paper like one of the ones on the syllabus. I am not expecting all of the proposals to necessarily be ones that could turn into dissertation papers. I am more interested in the “process” rather than the “result” - research is all about making gradual improvements, seeking feedback and making revisions, etc. Good research doesn’t just happen - it is a product of gradual revisions and the process is not always linear.

### **Optional Revise and Resubmit**

The “process” of research is the most important, and a big part of the “process” is seeking feedback and making revisions based on the feedback you receive. This is how great research is made - by everyone, not just students. With this in mind, you are encouraged, but not required, to submit a revision of your research proposal. Given the detailed feedback that I provide, and the diligence and dedication of prior students, it has been typical for scores to increase by about two points on average after a revision - often from an average of around 7 to an average of around 9/10. If you choose to resubmit, I will use your new re-submission grade (the grade for the first submission is not used at all). Those who choose not to resubmit just keep their originally assigned grade.

### **In-Class and Other Activities**

Research shows that students often learn better when instructors adopt some “active learning”, where students participate in class, relative to when instruction is based on lecture only. For this reason, there will be several in-class activities throughout the semester, in addition to some that you will do outside of class. These activities will vary by day, with some days having no activities and others having more than one. The weight given to each activity will differ depending on how complex the activity is. For example, some activities take up at least the entire class. Others are very quick.

If an activity requires preparation before class (e.g., reading an article) or requires that you bring something, I will give you instructions and notice. This will be on the page for that course day under the “Modules” tab on the Canvas page for the course. However, many activities are meant to be done without preparation and are mostly to gauge and encourage participation with the course content. Some of the activities will be done outside of class (e.g., submit a short reflection statement) or can be started during class and submitted later.

For activities done or started during class, in some cases you will be able to do the activities during class time even if you are attending via Zoom. In other cases, they activities will only be possible if you are attending in-person. Regardless, in many cases the activity, or a modified version of it, is still possible to be done without any penalty asynchronously (on your own time) and submitted later. Thus, most activities will still be possible regardless of if you are taking the course in-person, on Zoom, or asynchronously. For each activity, I will describe:

1. how and when the activity will be done (e.g., in person in groups, individually on your own time),
2. if there are any deadlines for when the activity must be submitted (usually there are none, but there are in some cases - I will warn you if so),
3. how the activity should be submitted (almost always it would be on Canvas),
4. if the activity is possible is to do (and how, if different) for those taking the course via Zoom or asynchronously, and

5. if and how the activity can be made up if you usually attend the class in-person (or on Zoom) but could not make the class that day.

Given that not everyone will be able to complete all the activities, even if they attend in-person, due to, e.g., occasional illness, religious holidays, family commitments, etc., or just not having the time to submit the activity later (many can be submitted later), I do provide some flexibility. I have the following policies:

1. For students *always* attending on Zoom or asynchronously: automatically dropping activities that cannot be done. I will automatically “drop” the scores for activities that you cannot do. This will occur occasionally but I am trying to avoid it as much as possible by providing modifications to the activity, if I can, which usually would be possible. (Note: the way I will “drop” these activities in practice is to give you full points for the activity rather than actually “dropping” it. This approach is much easier to do, leads to more accurate scores reported on Canvas, and still provides a very similar outcome mathematically.)
2. For *all* students - Automatically dropping two activity scores. I will automatically drop two (2) graded in-class activities from the calculation of your in-class activities grade. The in-class activities that will be dropped will be the ones with the lowest scores. If there are two activities with the same grade that could be dropped (e.g., two different zeros), then the grade with the most weight will be dropped (e.g., 0/3 would be dropped over 0/2). I do this “dropping” manually, so please note that your other activities grade on canvas does not include this dropping and will always be an underestimate. I will not drop any activities beyond two, regardless of why you could not do the activities. Please do not ask.

Most of the activities are lightly graded and most students get full points if they put in a reasonable amount of effort. Given this and the excellent attendance and work ethic of students in previous semesters, almost all students get above 95% on activities. However, it is not unusual for there to be a student who fails to submit numerous activities, and this results in their grade being one or two letter grades lower - but this usually only happens in my undergrad courses. So, it usually is not necessary for you to raise concerns about specific activity grades - but if you are not sure why you lost points then I can happy to discuss since the point of these is learning.

## Course Schedule and Topics

### Holidays and Canceled Classes

Our course meets on all Tuesdays and Thursdays from 3:30 to 4:45 p.m. starting Tuesday January 16 to Tuesday April 30 *except* for:

1. **Thursday Feb. 8** - While classes are not canceled this day, I am canceling our class since everyone will need time to prepare for the Muses parade (or may want to escape Uptown before it gets too crazy - but I *highly* recommend that you go because it is so much fun.)

2. **Tuesday Feb. 13** - Mardi Gras Day - No Classes.
3. **Tuesday Mar. 26** - Spring Break - No Classes.
4. **Thursday Mar. 28** - Spring Break - No Classes.
5. **Thursday Apr. 18** - While classes are still on this day, I am canceling our class since I will be out of state for work-related travel.

The classes I cancel are made up by asynchronous content rather than scheduling additional class time. You will find this content on Canvas - as a page under “Modules” for each course day that is made up.

## Exam and General Assessment Schedule

I will keep the assessment schedule for the course updated on Canvas. So, please refer to the deadlines as listed on Canvas since those will always be the most accurate.

Here is a summary of all the deadlines scheduled thus far. As detailed in course policies, some deadlines are flexible.

- **Quiz 1 - Feb. 20**
- Group assignment 1 (recommended deadline: Mar. 1)
- Group assignment 2 (recommended deadline: Mar. 26)
- **Quiz 2 - Apr. 2**
- First submission of the short research proposal (recommended deadline: Apr. 8)
- Group assignment 3 (recommended deadline: Apr. 30)
- **Final Exam - TBD by the Registrar**
- *The last day to submit anything except an optional revision to the short research proposal is May 6.*
- *The last day to submit an optional second revision to the short research proposal is May 9.*

The above summary schedule does not include the activities. These will be posted on Canvas on the page for each course day (and can also be found under the “Assignments” tab. Some activities are time-sensitive and have deadlines other than the hard deadline of May 6, but most activities can be submitted by the May 6 deadline. For more on my flexible deadlines policy, see the sub-section [Deadline Flexibility](#)

The above times and deadlines are subject to change. If I make any changes, I will update and redistribute this syllabus, and I will make announcements on Canvas and during class. Please note that the date and time of the final exam has not been published yet by the Registrar. Once this is known, we will discuss it and make sure it works for us (see below).



### **Possible Rescheduling of Quizzes and Final**

One possible change we may make to the above schedule to change the dates of Quiz 1 and Quiz 2 depending on when the quizzes/midterms are for Ph.D. Econometrics II and Microeconomics II, so that workload is better balanced for the Ph.D. students. We can discuss this in the first or second week of classes. If re-scheduling a quiz causes an issue for any student, they can work with me to take the quiz at a different time so long as that is worked out in advance.

Once we know the final exam dates, we can then from there determine if we want to have the final exam be at a different time. This may make sense if, due to random chance, the final exams for the economics Ph.D. students, or others, all happen to be scheduled back-to-back or something horrible like that. If the final exam time is changed, then students who cannot or prefer not to take the final exam at the new time can discuss with me to make arrangements to take the final exam at the original time or perhaps some other time.

### **Schedule for Topics and Readings**

This section provides a summary of the topics and readings in the course, and provides some advice on how to do the readings and which ones to do. However, please note that this list of readings and topics is an overview, and the actual topics and readings will vary slightly from this, as I may add or subtract readings as I find them later and I will not be able to keep the syllabus updated in real time. The place for you to see the most “up to date” list of the exact readings to do for each course day will be the page for each course day, which you can find on Canvas under the “Modules” page.

You can find all the readings, except for the textbooks, on Canvas. While you can find all non-website readings, i.e., the PDFs under “Files” then “Readings” and then sub-folders from there, the best way to find the readings is just to find them linked to on the page for each course day. On the page for each course day, I will link to the readings you need to do before the class, or any other readings that are relevant for the class. This should save you quite a bit of time.

### **Advice on Readings**

Please do not panic about by the number of readings on the syllabus. You’ll probably only read at most one third of the papers on the syllabus. And when I say “read”, usually you’ll be focusing on the introduction and conclusion. In few cases will you need to intimately know more about a paper - but usually it’s all about getting the takeaway and not worrying about all the details, especially when those details are econometric proofs.

This list of readings is obviously too long for you to read thoroughly in this course. The goal of this list is to make you aware of important classic reference prices (denoted with “C”), practitioners guides (“P”), technical pieces (“T”), and notable application papers (“A”). Papers with “J” are ones you won’t have to read: you’ll read one of the papers in the set and you will “teach” that paper to classmates, and they will teach their assigned papers to you during group discussions. This will happen through a “jigsaw literature review activity”

that me and other professors in the department wrote about (?). This jigsaw activity a more efficient and engaging way for you to see multiple examples.

Generally, the papers below with \*'s are the ones you'll likely need to read. However, I will explain on the page under "Modules" for each day what you will need to read, how in-depth to read, and by when, so please refer to Canvas rather than the syllabus for the most accurate guidance on readings for each course day. Generally I expect you to have read or skimmed the assigned papers before class and again sometime after depending on your preferred study habits. As a rough guide, the more \*'s I include in front of the paper, the more important it is. Any paper with two \*\*s will almost surely be required reading. Papers with one \* are more likely to be important ones that you should at least skim, focusing on the intro and conclusion (and maybe the application section if it's a technical paper with an application) so you can intuitively understand the technique and the rationale for it. Reading all the statistical proofs in papers is not important, unless you want to do pure econometrics research (i.e. developing methods), which I doubt. Focus on the intuition and applications.

The papers without \*'s are still useful or important, but they are more likely ones that you'd refer back to if you were to use the methodology in your own work. Or these are example papers if you want to see the technique in action again. It may be good to know a few examples of techniques in action as you can use them in examples during exams or in your own research.

Please note that these readings could change, but I will keep you advised of any major changes. I will only update and re-distribute the syllabus when I make major changes, such as to the evaluation criteria or numerous changes to the readings or topics. The main major change that I do expect to make is that I will be updating the more advanced differences-in-differences readings on the syllabus to better organize them for you and to reflect the more recent literature. The key thing that will really help us is that I will incorporate some recent overview papers that will be more much accessible and allow you to more easily understand the key takeaways of this evolving literature. I have not had the time to do this yet and it makes sense for me to do this closer to when we cover this, so that this content is fresher in my mind.

### **Using this Syllabus as a Reference Later**

This syllabus can also be a guide to you later as you (if you?) start using causal inference methodologies in your research. If you end up using a particular technique in your research later, I urge you to come back to this syllabus to take a look at the other methods papers that are listed here but that we couldn't cover in class. It is important for you to use up-to-date methodology in your research as otherwise you might be seen as lacking when you go on the job market (this has been discussed on # EconTwitter, with some economists saying that recent job market candidates who didn't incorporate the recent DiD literature were doing poorly). Many prior students report using this syllabus as a helpful reference later. Just please be aware that this syllabus is not an exhaustive resource: I do not have everything on here, especially since new research gets published every year.



## Acknowledgements

In coming up with this list of readings for the course, I acknowledge the support of my former professors (Marianne Bitler, now at UC Davis, and Christopher “Kitt” Carpenter, now at Vanderbilt) as they came up with useful lists of papers that I still use as references. I also acknowledge the support of Keith Finlay (former faculty here) who taught this course previously and had his own list of papers. I also thank many economists and researchers who contribute to # EconTwitter who helped me crowd-source some new DiD methodology papers (e.g., Scott Cunningham - @causalinf) and Ben Harrell - @elben). I also thank Sam Mann who pointed me towards some recent papers I missed that summarized the recent differences-in-differences literature.

## Topics and Readings Outline

### Introduction to the Course

- Overview of the course
- My course vs. Prof. Long’s (Econometrics I) and Prof. Denteh’s (Econometrics II) courses
- Using Zotero to organize papers and create a bibliography
- Work-life balance and mental health
  - \*\*MHE Ch. 1, 2
  - \*\*MM Ch. 1
  - \*Mixtape Pages 1 to 80
  - \*\*Causal Inference Pages 1 to 27 (good overview of basic statistics and basic commands in Stata)
  - \*Causal Inference Pages 38 to 44 (check this over if you need a refresher on concepts like bias, consistency, and mean squared error)
  - \*Causal inference bootcamp for high school and undergraduate students: <https://mattmasten.github.io/bootcamp/>

### Introduction to Causal Inference

- The fundamental problem of causal inference
- Overview of methods
  - \*\*MM Ch. 2
  - \*\*MHE Ch. 3 (read everything but instead of a full read, skim 3.1.1., 3.1.2., skip 3.3 for now, also skip 3.4.2, 3.4.3, and 3.5 for now)
  - \*Scott Cunningham’s Causal Inference Mixtape: [https://scunning.com/cunningham\\_mixtape.pdf](https://scunning.com/cunningham_mixtape.pdf) (do a “heavier” skim of pages 81 – 103, this provides another presentation of the content from MHE)

- \*C,P - [Imbens and Wooldridge \(2009\)](#) (Overview of causal inference)
- \*\*Causal Inference Pages 46 to 56 (The fundamental problem of causal inference. Great overview of when bias can occur.)
- \*\*P - Useful infographic of a flow-chart of causal inference, from Gema Zammaro, Dick Murnane, John Willett. Photo posted by David D. Liebowitz on [Twitter](https://twitter.com/DavidDLiebowitz/status/1214234438206246912/photo/1): <https://twitter.com/DavidDLiebowitz/status/1214234438206246912/photo/1>
- \*\*P - Another useful infographic from David Liebowitz, from [Twitter](https://twitter.com/DavidDLiebowitz/status/1196473161094615044/photo/1): <https://twitter.com/DavidDLiebowitz/status/1196473161094615044/photo/1>
- \*P - Edward Rubin's slides on causal inference (past about slide 41 it gets into IV, which is covered later): [https://raw.githubusercontent.com/edrubin/EC421W19/master/LectureNotes/11InstrumentalVariables/11\\_instrumental\\_variables.html#1](https://raw.githubusercontent.com/edrubin/EC421W19/master/LectureNotes/11InstrumentalVariables/11_instrumental_variables.html#1)

## Regression Control

- Can we use regression to do causality?
- Controlling for observables (i.e. "kitchen sink" OLS)
- Selection on Observables vs. Selection on Unobservables
- Other cautionary tales (omitted variables, measurement error, simultaneity)
  - \*C - [Angrist and Krueger \(1999\)](#) (Has a great discussion of regression control and how useful/not useful it is)
  - \*C - [Freedman \(1991\)](#) (A classic overview of why regression doesn't guarantee causality)
  - \*\*A - [Krueger \(1993\)](#) (A problematic example of selection on unobservables)
  - \*\*A - [DiNardo and Pischke \(1997\)](#) (Critiques the above "kitchen sink" OLS paper)
  - \*\*A - [Black et al. \(2003\)](#) (A great example of selection on observables)

## Binary Dependent Variables

- Linear probability model (LPM) vs. probit vs. logit
- Bias and inconsistency in LPM
- Marginal effects
- Estimation in Stata
  - \*\*Most intro econometrics textbooks have a good and more accessible section on binary dependent variables. I suggest you read that chapter. If you don't have a good undergraduate econometrics text, talk to your classmates in economics who can help.

- \*\*Causal Inference Pages 27 to 30 (some coverage of LPM, logit, and probit)
- \*\*P - Slides on LPM by Jonah Simmons <https://slideplayer.com/slide/8654838/>
- \*\*P - A short, accessible, overview by Andrew Dustan that covers a bit of all the topics in this section: <https://are.berkeley.edu/courses/EEP118/fall2010/section/13/Section%2013%20Handout%20Solved.pdf>
- \*\*P - A nice, accessible, overview by Paul von Hippel: <https://statisticalhorizons.com/linear-vs-logistic>
- \*\*P - Estimation in Stata and some intuition, via UCLA's Statistical Consulting office: <https://stats.idre.ucla.edu/stata/output/logistic-regression-analysis> (Logit) and <https://stats.idre.ucla.edu/stata/dae/probit-regression/> (Probit) (FYI they have many useful guides to Stata and common statistics issues!)
- \*\*P,T - Williams (2012) (Using the margins command in Stata. Also explains average marginal effects and marginal effects at the mean)
- P,T - Bartus (2005) (Useful for its explanation of average marginal effects versus marginal effects at the mean. The Stata code being used is a bit out of date since the "new" command "margins" is now used. So the above article would probably be better)
- When is LPM ok? Applied researchers and econometricians debate it out.
- Usually econometricians/statistician say to almost never use LPM. Usually applied and empirical researchers say "it depends"
- What I want to focus on here is weighting those downsides with some of the benefits of the LPM and what is used in practice, and why.
  - \*T - Hoxby and Oaxaca (2006) (one of the best, short, articles that discusses the bias and inconsistency issues of the LPM)
  - \*P - Dave Giles argues why one should avoid the LPM: <https://davegiles.blogspot.com/2012/06/another-gripe-about-linear-probability.html> (TL;DR: Don't use LPM except in a few specific circumstances. Here all the reasons why not, including bias in marginal effects. I don't care about the minor benefits of LPM you bring up. The issues are severe.)
  - \*P - Jörn-Steffen Pischke responds to some of Dave Giles' critiques: <http://www.mostlyharmlesseconometrics.com/2012/07/probit-better-than-lpm/> (TL;DR: The bias from LPM is less of an issue wrt estimating marginal effects, which is what we usually care about. LPM works fine for saturated models (lots of fixed effects, say, e.g., panel DiD regressions). Generally, LPM isn't bad and logit and probit aren't necessarily the true model.)
  - \*P - Jed Friedman discusses the debate between the two above: <https://blogs.worldbank.org/impactevaluations/whether-to-probit-or-to-probe-it-in-de> (TL;DR: Is more sympathetic to LPM, and highlights that if the predicted

probabilities fall well within 0 and 1 then it's probably fine. Again highlights Pischke's point that even if the effects are non-linear, logit and probit aren't necessarily the "correct" non linear models.)

### Standard Errors, Clustering, Bootstrapping, and Weighting

- "Raw" standard errors vs. "Robust" standard errors
- Clustering and the Moulton factor
  - \*\*MHE Ch. 8.2 (pages 308 to 315)
  - \*C,T - [Moulton \(1990\)](#) (Classic paper that introduces the clustered standard errors issue)
  - \*\*T,P - [Cameron and Miller \(2015\)](#) (Practitioner's guide to cluster-robust inference. Skip "few clusters" and "extensions" sections for now)
  - \*\*T,P - [Abadie et al. \(2017\)](#) (Newer paper on when to cluster)
- Two-way / multi-way clustering
  - \*T - [Cameron et al. \(2011\)](#) (Multi-way clustering. Important if you have two different non-nested clusters. E.g., you need to cluster on state since you have panel data, but you also need to cluster spatially)
  - \*P - Tom Zimmerman has a useful blog post on two-way clustering in Stata: <http://tomzimmermann.net/2018/08/22/two-way-clustering-in-stata/>
  - As for how to do two-way/multi-way clustering in Stata, check out `ivreg2`, `cgmreg`, or `reghdfe` Stata programs. All three programs can do it but they have some slight differences.
- Weighting
  - \*\*P,T - [Solon et al. \(2015\)](#) (Very helpful reference that discusses why/when weighting should be done. The go-to paper that is a crucial read.)
  - \*\*P,T - Short notes on using weights in Stata, by Yannick Dupraz: [https://parisschoolofeconomics.eu/docs/dupraz-yannick/using-weights-in-stata\(1\).pdf](https://parisschoolofeconomics.eu/docs/dupraz-yannick/using-weights-in-stata(1).pdf)
  - \*P,T - [Deaton \(1997\)](#) - (pages 67-73)
- Asymptotics vs. bootstrapping
  - \*\*MHE Ch. 8.2 (pages 293 to 308)
  - \*\*[Wooldridge \(2010\)](#) Ch. 12.8.2
  - \*C,T - [Horowitz \(2001\)](#) (Standard introduction to the bootstrap)
  - \*C,T - [MacKinnon \(2002\)](#) (Another useful overview of the bootstrap. This one is probably easier to read. Skip section 5 since that isn't that important for what I want you to focus on.)

### Introduction to Directed Acyclic Graphs (DAGs)

- DAGs are a way to visually show how variables interact and what your research

design is.

- DAGs are common in other fields but are only now becoming popular in economics.
- Economics uses more of the “Rubin Causal Framework” right now, which is what you see in the MHE textbook, but also in Mixtape pages 81 to 104.
  - \*\* Mixtape (pages 67 to 80)
  - \*\* [Imbens \(2019\)](#) (pages 1 to 24 for now)
  - \*\* [Steiner et al. \(2017\)](#) (skip sections on IV, RD, and propensity score matching until we get to those sections)

## Instrumental Variables

- IV as a possible solution to omitted variables, endogeneity, and measurement error
- Identifying assumption: exclusion restrictions
- Weak instruments
- IV in the context of the classical experiment
- Non-compliance and the local average treatment effect (LATE)
- Background and Introduction
  - \*MHE Ch. 4
  - \*\*MM Ch. 3
  - \*\*Mixtape: Instrumental Variables (pages 205 to 243)
  - \*\*Causal Inference Pages 83 to 104 (A nice, accessible, overview of IV)
  - \*\* Christopher Baum’s slides on IV. Helpful overview and discusses how to estimate IV in Stata: [https://www.researchgate.net/profile/Christopher\\_Baum2/publication/4923008\\_Using\\_instrumental\\_variables\\_techniques\\_in\\_economics\\_and\\_finance/links/02bfe50f6008716fed000000.pdf](https://www.researchgate.net/profile/Christopher_Baum2/publication/4923008_Using_instrumental_variables_techniques_in_economics_and_finance/links/02bfe50f6008716fed000000.pdf)
  - \* P - [Bollen \(2012\)](#) (A nice, accessible, overview of IV)
  - \* Edward Rubin’s slides on IV (scroll back on slides for a causal inference review): [https://raw.githubusercontent.com/edrubin/EC421W19/master/LectureNotes/11InstrumentalVariables/11\\_instrumental\\_variables.html#42](https://raw.githubusercontent.com/edrubin/EC421W19/master/LectureNotes/11InstrumentalVariables/11_instrumental_variables.html#42)
  - \* [Steiner et al. \(2017\)](#) (sections on IV)
  - \*C,P - [Angrist and Krueger \(2001\)](#) (Important overview of how IV is used)
  - \*C - [Rosenzweig and Wolpin \(2000\)](#) (Similar to the above)
  - \*P - [Nichols \(2007\)](#) (Good coverage of DiD, IV, and RD with Stata examples)
  - C,T - [Angrist et al. \(1996\)](#) (Foundational paper that discusses IV and assumptions, etc, required for it)
  - \*\*P,T - [Baum et al. \(2007\)](#) (Discusses the “iv2reg” Stata program)

- T - [Imbens \(2014\)](#) (An econometrician's perspective on the statistics literature on IV. Helpful as a summary of the stats literature on this topic, which is often harder to understand.)
- Weak IVs: issues and what to do about it
  - \*\*P,T - [Andrews et al. \(2019\)](#) (Recent paper with up-to-date advice on what to do regarding weak IVs, especially when there are other common concerns like heteroskedasticity and clustering)
  - \*\*P,T - [Pflueger and Wang \(2015\)](#) (Weak IV tests in Stata)
  - T - [Swanson et al. \(2018\)](#) (Excellent resource and summary article for IV with binary variables)
  - C,T - [Bound et al. \(1995\)](#) (Classic paper on weak IVs)
  - C,T - [Staiger and Stock \(1997\)](#) (Another classic paper on weak IVs)
  - T - [Flores-Lagunes \(2007\)](#) (Weak IV bias in finite samples)
  - P,T - [Finlay and Magnusson \(2009\)](#) (Weak IV test - "rivtest" - in Stata)
- IVs and the Local Average Treatment Effect (LATE)
  - T - [Angrist and Fernandez-val \(2013\)](#) (ExtrapoLATEing the LATE to a larger population using covariates)
  - T - [Mogstad et al. \(2018\)](#) (Another paper on trying to learn about the broader ATE)
- Evaluating examples of IVs – Activity
- Which IVs seem to meet the exclusion restriction?
- Which IVs might be weak?
- Which IVs provide a useful (or less useful) LATE? I.e. to what extent are the results externally valid?
  - \*\*P - Twitter thread on the “Huh?” test for the IV, via Andrew Heiss and Scott Cunningham: <https://twitter.com/andrewheiss/status/1193927703818227712>
  - A,J - [Levitt \(1997\)](#), [McCrary \(2002\)](#), and [Levitt \(2002\)](#) (Paper-Reply-Rejoinder on a famous IV paper)
  - A,J - [Hoxby \(2000\)](#), [Rothstein \(2007\)](#), and [Hoxby \(2007\)](#) (Another famous, and more heated, dispute about an IV paper)
  - A,J - [Anderson and Matsa \(2011\)](#) (Casual effect of fast-food restaurants on obesity)
  - A,J - [Angrist and Evans \(1998\)](#) (Causal effect of children on labor supply, using mixed-gender preferences for children)
  - A,J - [Bhalotra and Clarke \(2019\)](#) (Are twin births a good IV for number of children?)
  - A,J - [Algan et al. \(2017\)](#) (Political science-ish paper that uses a Bartik “shift-share” instrument)

- A,J - [Levitt \(2016\)](#) (Extremely influential and cool “coin toss” nudge paper)
- A,J - [von Hinke et al. \(2016\)](#) (Using genetic markers as an IV)
- C,A,J - [Angrist and Lavy \(1999\)](#) and the replication, [Angrist et al. \(2017\)](#) (Classic paper using class-size rules as an IV)
- Measurement error and IVs
  - \*C,T - [Hyslop and Imbens \(2001\)](#) (Classical paper on measurement error and IVs)
  - T - This Twitter thread by Vitor Possebom ( [PossebomVitor](#)) has a useful discussion of recent research on applying partial identification to measurement error. Focuses on binary variables that have measurement error: <https://threadreaderapp.com/thread/1203029622893486080.html>
- Bartik “shift-share” instruments
  - Originated in [Bartik \(1991\)](#) and popularized in [Blanchard and Katz \(1992\)](#).
  - My goal for you here is that you have a sense of what this IV is and how it’s constructed, so that you can (1) understand when it is used and (2) think about how it could be used in a possible paper.
  - \*P - [Goldsmith-Pinkham et al. \(2019\)](#) (Recent popular paper that walks you through this IV)
  - A - [Borusyak et al. \(2019\)](#) (Similar to the above)
  - A - [Algan et al. \(2017\)](#) (Political science-ish paper that uses a Bartik “shift-share” instrument)
- Other interesting IV methodology papers
- Most of these are working papers. They will be important to watch.
  - T - [Das and Polachek \(2019\)](#) (Recent paper to watch. Suggests a sort of “reverse IV” as an alternative to traditional IVs.)
  - T - [Young \(2019\)](#) (Working paper that makes some bold claims about how IVs have been used in practice. Generally has a negative view about IV.)
  - T - [Lewbel \(2012\)](#) (IV in mismeasured regressor models, triangular systems, and simultaneous equation systems)
  - T - “ivreg2h” Stata code, which implements [Lewbel \(2012\)](#): <https://econpapers.repec.org/software/bocbocode/s457555.htm>

## Experiments

- Intent-to-Treat (ITT) vs. Treatment-on-the-Treated (TOT)
- Compliance rates
- Balance/Randomization tests
  - \*\*Causal Inference Pages 44 to 45 (overview of experiments)



- \*\*A - [Ludwig et al. \(2012\)](#) (One of the many papers on Moving to Opportunity. A good summary piece because it's so short.)
- Examples of Experiments: Moving to Opportunity, Tennessee STAR, field experiments, health insurance experiments
  - A,J - [Krueger \(1999\)](#) (Notable experiment looking at classroom size and academic outcomes)
  - A,J - [Manning et al. \(1987\)](#) (Notable health insurance experiment)
  - A,J - [Finkelstein et al. \(2012\)](#) (Notable health insurance experiment)
  - A,J - [Flory et al. \(2021\)](#) (Increasing diversity in hiring through diversity language in job ads)
- Actual “natural” experiments (exploiting unintentional randomization)
- Technically these are IV but have a strong “experimental” flavor and I wanted to highlight them.
  - A,J - [Maestas et al. \(2013\)](#) (Effect of Social Security Disability Insurance on employment)
  - A,J - [Palmer et al. \(2019\)](#) (Effect of a homelessness prevention program on the likelihood of committing crime)
  - A,J - [Sacerdote \(2001\)](#) (Solves the “Manski reflection problem”, i.e. endogenous choice of peers)
  - A,J - [Bhuller et al. \(2020\)](#) (Using random assignment to picky or less picky judges to determine the effect of incarceration on recidivism)
  - A,J - ? (Using random assignment of police to 911 calls to study how the race of the police officers relates to officer use of force based on the demographics of the neighborhood.)
- Field experiments
  - Brief introduction to lab/vignette vs. field experiments
  - Brief introduction on audit studies (also called audit correspondence field experiments)
    - A,J - [Neumark et al. \(2019\)](#) (My recent audit field experiment using resumes, studying age discrimination in hiring)
    - A,J - [Giulietti et al. \(2019\)](#) (Racial discrimination in access to local services)
    - A,J - [Butler and Broockman \(2011\)](#) (Do political representatives racially discriminate against constituents?)
    - A,J - [Ameri et al. \(2018\)](#) (Disability discrimination in AirBnB bookings)
- Lab Experiments
  - \*P - [Falk and Heckman \(2009\)](#) (Overview of lab experiments in economics)
  - \*C,A - [Gneezy et al. \(2003\)](#) (Gender differences in competition)
  - A - [Horton et al. \(2011\)](#) (Introduction to using MTurk for experiments)



## Difference-in-Differences (DiD)

- This is the largest and most important part of the course. About half of causal inference papers use a DiD over other strategies. This is largely because most policy examinations allow for a DiD but not other approaches.
- Advice for Economics Ph.D. students: the DiD methodology literature is evolving quickly, with some major papers written on it in the last few years. It is not possible for me to cover all these papers in this course. I will do my best to give you a solid understanding of DiD and what I think the best practices now are. But I strongly urge you to read more of these papers and follow the evolution of the methodology literature if you end up doing a DiD paper. You will need to be using something close to best practices in your dissertation research. You may not be able to rely on your dissertation committee entirely to tell you what methodology is best for all cases in your research. Some professors are up-to-date on recent methodologies and some are not, and it can vary by the methodology (e.g., I have a comparative advantage in experiments and RD but am weaker at IV). Regardless of how much your dissertation committee knows, you need to do more of the work yourself to identify the best methodologies for your own research. Your committee will help guide you and will often help you with troubleshooting, but you will need to show some initiative and independence. Generally, I have been very impressed with the methodological strength of most of the work that our Ph.D. students do, and their research is often highly competitive with their peers at better-resourced departments or who have better-resourced advisors.
- Note that while this section does include much of the recent literature, this literature has evolved rapidly and I do expect to revise this section and the readings for the latter half of the DiD content at least a week or so before we get to it. Most of the lecture content will stay the same, and only a few course days will be affected. But many of these readings will change - mostly to better organize these for your review later as this syllabus is supposed to serve as a useful guide.
- Summary and Background Readings
  - \*\*Wooldridge (2010) Ch. 10 (intro to panel methods)
  - \*\*MHE Ch. 5
  - \*\*MM Ch. 5
  - \*\*P - [Zeldow and Hatfield \(2019\)](#) (Good applied overview, with applications to health policy. <https://diff.healthpolicydatascience.org/>)
  - \*\*Mixtape: Panel Data and Difference in Differences Chapters (Pages 245 to 286)
  - \*\*Causal Inference Pages 71 to 82 (A nice, accessible, overview of panel methods and DiD)
  - \*\*C - [Meyer \(1995\)](#) (Good coverage of DiD)

- \*\*P - Nichols (2007) (Good coverage of DiD but also IV and RD)
- \*\* Twitter thread by Daniel Millimet (dlmillimet) on why it's very important for you to strive to use the most up-to-date methods in DiD, especially given recent developments: <https://twitter.com/dlmillimet/status/1175152198558240768>
- Introduction to DiD
- Fundamental DiD assumption of parallel trends
- What happens when parallel trends is violated?
- \*C,A - Acemoglu and Angrist (2001) (A classic DD paper, but with problematic methodology)
- \*\*A - Button (2018) (Critiques Acemoglu and Angrist (2001) and shows the importance of the parallel trends assumption and controlling for group-specific time trends.)
- \*A - Madrian (1994) (A DiD without a time dimension. Treatment based on the intersection of two different groups.)
- DiD - Endogeneity of Policies and SUTVA
  - The Stable Unit Treatment Value Assumption (SUTVA)
  - \*C - Besley and Case (2000) (Issues with endogeneity of policies)
  - \*\*A - Button (2019) (My job market papers: an example paper that explores endogeneity and DiD assumptions, including SUTVA)
- DiDiD - Differences-in-Differences-in-Differences
  - Benefits of adding a third dimension to get a DiDiD instead of a DiD
  - \*\*A - Button (2018) (But this time focusing on the DiD vs. DiDiD)
  - A - Bitler and Carpenter (2016) (An excellent example of a DiDiD)
- DiD -Introduction to Clustering, Standard Errors, and Inference in DiD
  - A re-cap of the clustering issue and multi-way clustering, but in a DiD context
  - \*\*MHE Ch. 8
  - \*C,T - Bertrand et al. (2004) (One of the most cited papers in economics and applied statistics. Brought up the issue that we need to cluster standard errors - or similar - at the “level of policy variation” in DiD studies.)
  - \*\*C,T,P - Cameron and Miller (2015) (Guide to cluster-robust inference. Good to re-read, but again skip “few clusters” and “extensions” for now)
  - \*T - Cameron et al. (2011) (Multi-way clustering. Important if you have two different non-nested clusters. E.g., you need to cluster on state since you have panel data, but you also need to cluster spatially)
- DiD - Inference with Few Treated Clusters in DiD
  - \*\*C,T,P - Cameron and Miller (2015) (Now read the “Few clusters” section for a summary of this literature)

- \*\*C,T,P - Donald and Lang (2007) (Important paper that makes clear how a DiD with only two groups can be problematic)
- \*\*P - Roodman et al. (2019) (Discusses the Stata program “boottest” which allows for wild cluster bootstrapping in many contexts)
- \*C,T - Cameron et al. (2008) (Bootstrapping to improve inference when there are few clusters)
- \*T - Conley and Taber (2011) (The paper that introduced “Conley-Taber confidence intervals”. Required when there are fewer than ten treated clusters but at least 20 or so clusters total.)
- \*T - Mackinnon and Webb (2019) (Applies randomization inference to the situation of few treated clusters in a DiD. Presents a more accessible summary of randomization inference. Like Conley and Taber (2011), won’t work if there are fewer than about 20 clusters total.)
- T - MacKinnon and Webb (2018) (Similar to the above paper but less specific to DiD)
- T - Mackinnon and Webb (2017) (Similar to the above paper but deals with clusters that differ significantly in size (some clusters have lots of observations while others do not))
- DiD - More on Group-Specific Time Trends and the Parallel Trends Assumption
- Blog post summarizing recent literature by David McKenzie: [https://blogs.worldbank.org/impactevaluations/revisiting-difference-differences-parallel-trends/cid=SHR\\_BlogSiteShare\\_EN\\_EXT](https://blogs.worldbank.org/impactevaluations/revisiting-difference-differences-parallel-trends/cid=SHR_BlogSiteShare_EN_EXT)
  - \*\*T - Mora and Reggio (2019) (A clear presentation of the assumptions behind “parallel paths” in the DiD)
  - \*C,A - Friedberg (1998) (Classic paper on the effect of unilateral divorce laws on divorce rates)
  - \*C,A,P - Wolfers (2006) (Critiques the paper above by showing how sensitive the results are to estimated group-specific time trends)
  - \*\*T - Kahn-Lang and Lang (2019) (Important reflections on issues that arise in a DiD)
  - \*A,T - Meer and West (2016) (Raises the issue of if the treatment effect would appear in levels or in growth, and how time trends could attenuate estimates.)
  - \*\*T - Freyaldenhoven et al. (2019) (Suggests a novel way to net out pre-trends)
  - T - Roth (2019) (Doing a pre-test for parallel pre-trends is problematic)
  - T - Rambachan and Roth (2019) (Suggests a more “honest” way to deal with pre-trends)
- DiD - Event Study (a.k.a. Staggered Adoption Design)

- \*\*A - [Button \(2018\)](#) and [Button \(2019\)](#) (Previously covered papers, include event study figures)
- A - [Reber \(2005\)](#) (A very clear demonstration of the event study, which lets you visualize time trends)
- C - [Jacobson et al. \(1993\)](#) (Classic reference/example of an event study)
- A,C - [McCrary \(2007\)](#) (Another somewhat classic and great example)
- \*\*T - [Sun and Abraham \(2021\)](#) (Treatment effect heterogeneity makes previous event studies hard to interpret)
- \*\*T - [Gardner \(2021\)](#) (DiD does not identify a group  $\times$  period ATE - proposes two-stage method that is robust to treatment-effect heterogeneity under staggered adoption)
- T - [Borusyak and Jaravel \(2017\)](#) (Raises concerns about the common methodology used in event studies. An important paper to watch.)
- DiD - Introduction of Synthetic Control (SC)
  - Introduction and comparison to a more “standard” DiD
  - \*\*C,P,T - [Abadie et al. \(2010\)](#) (The paper that introduced this technique)
  - \*\*Mixtape: Synthetic Control (Pages 287 to 314)
  - T - [Gardeazabal and Vega-Bayo \(2017\)](#) (Paper comparing synthetic control to DiD, generally finds that synth is better if it can provide a good fit)
  - A - [Cavallo et al. \(2013\)](#) (Notable application to studying the effects of natural disasters)
  - A - [Billmeier and Nannicini \(2013\)](#) (Notable application to studying the the effects of economic liberalization episodes)
- DiD - Synthetic control with multiple treated groups
  - A,T - [Dube and Zipperer \(2016\)](#) (Application to minimum wages)
  - A,T - [Kreif et al. \(2016\)](#) (Application to health economics - hospital P4P schemes and mortality)
- DiD - Covariates and synthetic control
  - T - [Kaul et al. \(2017\)](#) (Never use all pre-period outcome variables together with controls)
  - T - [Botosaru and Ferman \(2017\)](#) (More discussion/analysis of covariates in synthetic control)
- DiD - Other methodological improvements in synthetic control since [Abadie et al. \(2010\)](#)
  - A,T - [Eliason and Lutz \(2018\)](#) (Constructing synthetic control weights when you have more than one outcome variable)
  - \*T - [Arkhangelsky et al. \(2019\)](#) (Introduces Synthetic DiD [SDiD], a superior combination of SC and DiD. Hopefully Stata/R code is made available so

that this technique can become common practice. Seems like this may become the standard over the more “classic” synthetic control.)

- T - [Athey et al. \(2018\)](#) (Matrix completion methods applied to DiD. A good paper to watch to see if code gets created to do this, such that this technique becomes more standard.)
- T - [Ben-Michael et al. \(2021\)](#) (Introduces augmented synthetic control, which can reduce bias, and introduces the R package “augsynth”. Consider adopting this approach if you use synthetic control.)
- T - [Ferman et al. \(2020\)](#) (Discusses specification searching (“cherry picking”) in SC and how to avoid it)
- DiD - The DiD Revolution
  - Numerous highly-impactful papers have been written recently that fundamentally change how we have to estimate DiD.
  - I will not have time to cover all the papers and all the nuance in them. Below are listings of these papers so you can read more if you’d like.
  - What we will focus on is one of the more important and popular developments - the Two Stage DiD (2SDiD)
  - \*\*\*P - ([Cunningham, 2021](#)) (Helpful overview of the revolution and explanation of 2SDiD.)
  - \*\*P - ([Baker, 2019](#)) (Similar to the above in tone but broader.)
  - \*\*T, P - Mixtape p. 461-510 (A more thorough and technical textbook-style coverage of this.)
- DiD - The Bacon Decomposition
  - A prominent contribution to the DiD Revolution.
  - You’ll want to be familiar with this one so you don’t seem out-of-date.
  - Essentially shows how the two-way fixed effects DiD estimator is really a combination of all 2x2 possible group/period matches.
  - T - [Goodman-Bacon \(2019a\)](#) (The DiD estimator is a weighted combination of all 2x2 - two group/two period - DiD estimators)
  - \*\*P - Slides on the Bacon decomposition. Very helpful, accessible walk-through of the intuition behind the paper: [https://www.stata.com/meeting/chicago19/slides/chicago19\\_Goodman-Bacon.pdf](https://www.stata.com/meeting/chicago19/slides/chicago19_Goodman-Bacon.pdf)
  - \*\*P - Thread by Andrew Goodman-Bacon where he explains the Bacon decomposition: <https://twitter.com/agoodmanbacon/status/1039126592604303360>. See also this other thread by Andrew Goodman-Bacon: <https://twitter.com/agoodmanbacon/status/1154158589323415552>
  - \*\*P - [Goodman-Bacon \(2019b\)](#) (“So you’ve been told to do my difference-in-differences thing: a guide” by Andrew Goodman-Bacon. URL: [https://cdn.vanderbilt.edu/vu-my/wp-content/uploads/sites/2318/2019/10/09023516/so\\_youve\\_been\\_told\\_dd\\_10\\_9\\_2019.pdf](https://cdn.vanderbilt.edu/vu-my/wp-content/uploads/sites/2318/2019/10/09023516/so_youve_been_told_dd_10_9_2019.pdf))

- T,P - The Stata command “BACONDECOMP” conducts the “Bacon decomposition” and can be downloaded: <https://ideas.repec.org/c/boc/bocode/s458676.html>. A related Stata journal article is likely forthcoming so watch this space. The help file for the program is pretty good though.
- A - Twitter thread where Andrew Baker replicates a paper using the Bacon decomposition and other methods: [https://twitter.com/Andrew\\_Baker/status/1212136421974110209](https://twitter.com/Andrew_Baker/status/1212136421974110209)
- A - Hill et al. (2019) (A newer DiD that incorporates some recent methodologies, such as Goodman-Bacon (2019a))
- DiD - Some examples of dosage design / treatment intensity
  - A - Goodman-Bacon (2018) (Effect of medicaid on mortality)
  - C,A - Bleakley (2007) (Classic paper showing huge short and long term effects of a campaign to eradicate hookworm in the American South)
  - A - Argys et al. (2017) (Effects of losing public health insurance on financial distress)
- Fuzzy DiD
  - A DiD where treatment is not binary - e.g., partial or gradual exposure to the treatment.
  - \*C,A - Duflo (2001) (An example of a fuzzy DiD)
  - T - de Chaisemartin and D’Haultfoeuille (2018) (Critiques the Wald-DID method and suggests two better alternatives)
  - T,P - de Chaisemartin et al. (2019) (Information on the “fuzzydid” Stata program that you can download: <https://ideas.repec.org/c/boc/bocode/s458549.html>.)
- DiD - Matching and DiD/Synthetic Control
- Important papers to watch, if you do a DD in the future, to see how these techniques develop.
  - A,T - Deryugina et al. (2018) (An innovative application that tries to better merge synthetic control and DiD using matching)
  - T - Imai et al. (2019) and Imai and Kim (2019) (Applies matching models to DiD)
  - T - Daw and Hatfield (2018b) and Daw and Hatfield (2018a) (Bias from regression to the mean in matching DiD estimation)
- DiD - Negative weights in DiD
- Related somewhat to the “Bacon Decomposition”. Likely not covered due to time constraints.
  - T - de Chaisemartin and D’Haultfoeuille (2018) (One of a few recent papers showing that weights in a DiD can sometimes be negative, leading to incorrect inference. The authors propose a novel estimation strategy that

- gets around this.)
- T,P - The “did\_ multipleGT” Stata program: <https://ideas.repec.org/c/boc/bocode/s458643.html>
  - T,P - Twitter thread summarizing the “did\_ multipleGT” Stata program: <https://twitter.com/CdeChaisemartin/status/1213188435197906944>
  - T - ? (“Negative Weights are no Concern in Design-Based Specifications”)
- DiD - Additional recent technical papers that you’ll want to possibly adopt if you do a DiD paper. These papers are mostly working papers and it will be important to see how the published versions differ, and to what extent these papers get incorporated into common practice. You may be left in the dust if you can’t keep up with this breaking work. We don’t have time to get into these papers so you’ll want to take a look at them later if these methodologies are relevant to your research.
- T - [Athey and Imbens \(2018\)](#) (Applies design-based analysis to a DiD setting)
  - T - [Callaway and Sant’Anna \(2019\)](#) (Proposes a new and improved DiD estimation strategy)
  - T - [Keele et al. \(2019\)](#) (Develops a sensitivity analysis test to determine how much bias would be necessary to change a study’s conclusions)
  - T - [Kropko and Kubinec \(2017\)](#) (Why the two-way fixed effects model is difficult to interpret)
  - T - [Manski and Pepper \(2018\)](#) (A notable application that applies bounded variation to DiD)
  - T - [Miller and Ulrich \(2019\)](#) (Introduces the issue of selection into identification in DiD)
  - T - [Roth \(2019\)](#) (Doing a pre-test for parallel pre-trends is problematic. Develops a pre-testing correction.)
  - T - [Sant’Anna and Zhao \(2018\)](#) (Suggests combining inverse probability weighted estimators with ones that deal with treatment effect heterogeneity)
  - T - [Xu \(2017\)](#) (Incorporates the interactive fixed effects model into the synthetic control. Had a good discussion in the introduction of the pre-trends issue and how it has been dealt with.)
  - T - [Zimmert \(2018\)](#) (On DiD estimation with common trends that are controlled for with covariates. Discusses a more efficient way to estimate this.)
  - T - [Gibbons et al. \(2019\)](#) (Dealing with heterogeneous treatment effects)
  - \*\*T - [Gardner \(2021\)](#) (DiD does not identify a group  $\times$  period ATE - proposes two-stage method that is robust to treatment-effect heterogeneity under staggered adoption)



- \*\*T - [Sun and Abraham \(2021\)](#) (Treatment effect heterogeneity makes previous event studies hard to interpret)

## Regression Discontinuity Design (RD)

- Introduction and background
- Sharp RD
- RD plots
  - \*\*MHE Ch. 6
  - \*\*MM Ch. 4
  - \*\*Mixtape: Regression Discontinuity Design (Pages 153 to 204)
  - \*Causal Inference Pages 105 to 116 (A decent overview with some Stata examples, but other readings are better for the basics)
  - \*\* [Steiner et al. \(2017\)](#) (See DAGs for RD by reading the RD sections)
  - \*\*For all your RD software needs (both Stata and R) see all these RD programs here: <https://sites.google.com/site/rdpackages/home>
  - \*\*P - [Cattaneo et al. \(2019a\)](#) (Ch. 1, 2, and 3) (Most important and helpful reading. This book provides an overview of RD and is a good “how to” guide that is more up-to-date. This is relatively more accessible, too.)
  - \*\*P - [Skovron and Titiunik \(2015\)](#) (Another “practical guide” paper, with more emphasis on Political Science examples. Shares some content with [Cattaneo et al. \(2019a\)](#))
  - \*P - [Lee and Lemieux \(2010\)](#) (Similar to the above, but a bit out of date given the methodological improvements in the last ten years)
  - P - [Imbens and Lemieux \(2008\)](#) (Similar to the above paper, but not quite as useful)
  - P - [Nichols \(2007\)](#) (Good coverage of DiD, IV, and RD with Stata examples. A bit outdated, [Cattaneo et al. \(2019a\)](#) is more up-to-date, as are the other papers by those authors.)
  - T,C - [Hahn et al. \(2001\)](#) (Classic technical RD paper)
  - C - [Cook \(2008\)](#) (Discusses the history of RD in educational psychology, statistics, and economics)
  - C,A - [Lee \(2008\)](#) (Classic paper, used commonly as an example. Measures the incumbency effect in U.S. House elections.)
  - C,A - [Lee et al. \(2004\)](#) (Classic paper, used commonly as an example. I ended up replicating this in grad school and it led to two publications, one replication, and one theory paper - [Button \(2016\)](#))
- Current best practices in estimating RD
  - The authors Calonico, Cattaneo, and Titiunik (and some other co-authors) have spent a lot of time developing the current standard for RD when the



- assignment variable is continuous
- Below are a collection of papers that detail the most-to-do methodologies.
  - There are a mix of the theoretical papers (where they developed the techniques) and lots of applied papers that are easier to learn from, and that teach you how to estimate this in Stata or R
  - \*\*P - [Cattaneo et al. \(2019a\)](#) (Ch. 4)
  - \*\*P,T - [Calonico et al. \(2016\)](#) (Useful summary, with a more detailed discussion of their “rdrobust” program, which is also discussed in Ch. 4 of the book above)
  - T - [Calonico et al. \(2014a\)](#) (More technical piece that introduces their approach)
  - T,P - [Calonico et al. \(2014b\)](#) (Older Stata journal article)
  - Validating the RD design
    - Testing the non-manipulation assumption using a density test of the assignment variable
    - Testing the continuity of covariates
    - Testing alternative (“fake”) cutoffs as a falsification test
    - \*\*P - [Skovron and Titiunik \(2015\)](#) (Pages 25 and 30)
    - \*\*P - [Cattaneo et al. \(2019a\)](#) (Ch. 5 and 6)
    - \*T - [McCrary \(2008\)](#) (non-parametric test)
    - \*T - [Frandsen \(2017\)](#) (parametric test)
  - Introduction to fuzzy RD
    - Fuzzy RD as an IV
    - Example of a fuzzy RD
    - \*\*A - [Müller and Shaikh \(2018\)](#) (How does your spouse’s retirement affect your health?)
    - \*P - [Lee and Lemieux \(2010\)](#) (Shows how fuzzy RD differs from sharp RD, so can be a useful read)
  - Other RD issues
    - Discrete assignment variables, heaping bias, rounding bias, measurement error, parametric model selection, model uncertainty
    - Likely not covered due to time constraints. Check these papers out if you end up doing an RD.
    - T - [Button \(2016\)](#) (Why we really don’t know what we’re doing with parametric estimation in RD)
    - T,C - [Lee and Card \(2008\)](#) (Issues with discrete data with an RD)
    - T - [Gelman and Imbens \(2019\)](#) (Don’t use high order polynomials with RD)

- T - [Barreca et al. \(2016\)](#) (An issue that can come up with discrete assignment variables)
- T - [Dong \(2015\)](#) (Another issue that can come up with discrete assignment variables)
- T - [Pei and Shen \(2017\)](#) (Discusses the issue of measurement error in the assignment variable)
- T - [Bartalotti and Brummet \(2017\)](#) (Improves the methodology of RD when you have clustered data)
- RD with multiple cutoffs and multiple scores and Geographic Regression Discontinuity Design (GRD)
  - Sometimes you have more than one assignment variable. This occurs for Geographic Regression Discontinuity Design (GRD), where you exploit the fact that policies change discontinuously at borders.
  - \*\*T,P - [Keele and Titiunik \(2015\)](#) (Intro. to using geography with an RD, with applications in Political Science)
  - P - The “rdmulti” package for Stata and R: <https://sites.google.com/site/rdpackages/rdmulti>
  - T - [Cattaneo et al. \(2016\)](#) (A more up-to-date paper discussing the multiple score/cutoff issue. Tests different approaches and suggests that sometimes the prior methods were not ideal.)
  - T - [Reardon and Robinson \(2012\)](#) (A very thorough piece. Compares and contrasts five different approaches that can be used.)
  - T - [Wong et al. \(2013\)](#) (Similar to above: compares different approaches)
  - T - [Cattaneo et al. \(2019b\)](#) (New approach to extrapolate a treatment effect in a multi-cutoff RD)
- RD-DiD (Research designs that combine an RD with a DiD)
  - Will cover briefly so you get the sense of what this methodology looks like
  - \*A - [Asfaw \(2019\)](#) (but one good example - on Medicare Part D)
- Regression Kink Design (RKD)
  - Brief overview so you can see which situations allow you to use an RKD
  - \*\*Mixtape (pages 202 to 204)
  - \*T,P - [Card et al. \(2017\)](#) (Great overview paper)
- Comparative Regression Discontinuity Design (CRD)
  - Combines an RD with an untreated (control) group. Useful in the instances where you have one group that gets treated based on an RD, but some other group that you have data on but that doesn't get treated.
  - C,T - [Wing and Cook \(2013\)](#) (Introduced the technique)
  - T - [Tang et al. \(2017\)](#) (Builds on the above and improves the methodology)

- Other recent technical papers (check these out if you do an RD in the future)
  - Will be important to watch these to see how the methodology improves or how standards change around what to do
  - T,P - [Eggers et al. \(2018\)](#) (Read this if your assignment variable is based on population)
  - T - [Calonico et al. \(2019\)](#) (RD with covariates)
  - T - [Cattaneo et al. \(2019c\)](#) (Power calculations using the Stata program “rdsampsi”. Useful if you are going to come up with treatment based on an RD and you want to know how many observations you need.)
  - T - [Cerulli et al. \(2017\)](#) (Introduces the concepts of a treatment effect derivative and a complier probability derivative. These measure the stability of the treatment effect. The estimation is easy and can be done in Stata.)
  - T - [Bartalotti et al. \(2017\)](#) (Suggests a new approach that creates bootstrapped confidence intervals)
  - T - [Bartalotti and Brummet \(2017\)](#) (Improves the methodology of RD when you have clustered data)
- More notable RD examples (if you are interested, not covered)
  - These may use some out-of-date methodology but are really interesting or important examples of RD
  - A - [Anderson and Magruder \(2012\)](#) (Do Yelp ratings affect restaurant demand?)
  - A - [Carpenter and Dobkin \(2009\)](#) (Effect of alcohol consumption on mortality - using age and legal drinking age)
  - C,A - [Card et al. \(2008\)](#) (Effect of Medicare on health care utilization - using age)
  - C,A - [Card et al. \(2009\)](#) (Related to above, but effect of Medicare on mortality)
  - C,A - [Ludwig and Miller \(2007\)](#) (Effect of Head Start on education and mortality - using cut-off funding assignment of counties)
  - A - [Matsudaira \(2008\)](#) (Effects of summer school on educational outcomes)

### Propensity Score Matching

- Introduction to the technique
  - \*\*Causal Inference Pages 57 to 70 (A nice, accessible, overview of matching)
  - \*\*A - [Anderson \(2017\)](#) (A well-done, modern application of propensity score matching)

- \*\* Slides on p-score matching by Vivien Chen and Krissy Zeiser: <http://t.edu.jg.com.cn:81/forum/201206/24/b16b694ff70c/Implementing%20Propensity%20Score%20Matching%20Causal%20Analysis%20with%20Stata%EF%BC%88%E9%87%8D%E8%A6%81%EF%BC%89.pdf>
- \*\* [Steiner et al. \(2017\)](#) (See DAGs for propensity score by reading the sections that relate to this)
- \*Mixtape: Matching and subclassification Chapter (pages 105 to 151)
- P - Stata program “PSMATCH2” by Edwin Leuven and Barbara Sianesi: <https://econpapers.repec.org/software/bocbocode/S432001.htm>
- C,T - [Rosenbaum and Rubin \(1983\)](#) (Classic introduction to propensity score matching)
- C,T - [Heckman et al. \(1998\)](#) (Another classic technical paper. Extends [Rosenbaum and Rubin \(1983\)](#).)
- P - [Abadie et al. \(2004\)](#) (Conducting matching in Stata)
- P - [Caliendo and Kopeinig \(2008\)](#) (Guidance on doing matching)
- Classic propensity score matching papers which replicate and critique [LaLonde \(1986\)](#) (not covered but take a look at these if using p-score in the future)
  - C,A - [LaLonde \(1986\)](#) (Classic paper that compares matching to experimental estimates)
  - T - [Smith and Todd \(2005\)](#) (Also see the comment from Dehejia and Smith and Todd’s rejoinder in the same issue of the journal.)
  - A - [Dehejia and Wahba \(1999\)](#)
  - A - [Dehejia and Wahba \(2002\)](#)

### Conclusion of the Course

- Overview of the course
- The Ten Commandments of Applied Econometrics
- Next steps over the summer
- Discuss the final and comprehensive exam
  - \*\*P - [Kennedy \(2002\)](#) (The 10 Commandments of Applied Econometrics)
  - \*MM Ch 6. (provides a nice overview of most of the causal inference approaches in the course)

### Course Policies

Below are course policies regarding office hours, deadline flexibility, regrading, attendance, attending remotely, class recordings, accessibility, inclusion, the Code of Academic Conduct, and Title IX (policies and supports around sexual assault and other violence).

## Pronouns

My pronouns are they/them/their or he/him/his. Either set is great. If you've never heard of pronouns before, please read this for an introduction: <https://www.mypronouns.org/>.

Thank you to those of you who added your preferred pronouns to your account on Gibson! I would appreciate if everyone could add those, regardless of your gender or transgender/cisgender status. This is helpful for several reasons:

- Members of the Tulane community know which pronouns to use for you, making it more likely that people will use pronouns for you that you prefer.
- It normalizes the use of pronouns. If few people mention their pronouns on Gibson or in other contexts (e.g., email signatures) then it stands out more when transgender or gender non-conforming individuals mention them. Cisgender allies can be very helpful by mentioning their pronouns too and helping to normalize the idea that we should not always assume what someone's pronouns are and that we should seek to learn and use the pronouns that each person prefers.

For more information on how to add your preferred pronouns to Gibson, or other ways Tulane is working to be more inclusive about preferred pronouns and preferred names, see: <https://registrar.tulane.edu/preferred-first-name-and-pronoun/faqs>. Thank you for helping make Tulane more welcoming to transgender and non-binary students and faculty.

## Office Hours

If you have questions that are more detailed and can't be handled by email, then you can book an appointment with me. I do not have traditional office hours during set times, but rather I use booking systems to allow for additional flexibility.

If you need a *meeting in-person*, please use this URL to book a meeting: <https://patrickbutton.youcanbook.me/>. Note that I am available for quick questions after class, but questions that will take longer than a few minutes may require an appointment depending on how many other students have questions after class and to what extent I have time after class.

If you are ok with *meeting on Zoom*, then I will have significantly more availability. You can use this URL to book a Zoom meeting with me: <https://app.reclaim.ai/m/pbutton>

Both systems allow you to cancel and reschedule appointments if needed. If you have difficulty finding a meeting time that works for you, then please email me and I may be able to work something out with you.

## Canvas

We will use Canvas for most of the course content and management. I will be uploading all files related to the course on Canvas. I will create pages for each class day on Canvas, which you can find by clicking on the "Modules" tab. These pages for each day provide organized information on each class covered (e.g., required reading, topics covered, slides). Through

Canvas you can also access your grades/scores, the most up-to-date syllabus PDF (under “Files”), Zoom recordings, and you will also submit assignments through Canvas.

### **Communication on Canvas**

I will send you messages through Canvas sometimes, as this is a more accurate and easy way than email for me to message all students at once. But usually I will post under “Announcements” instead of sending messages. You will want to check Canvas regularly to make sure you don’t miss anything. I highly recommend that you download the Canvas student app on your phone and turn on notifications for this course so that you can get any messages and announcements in a timely fashion. This can be helpful during exams when I send out an announcement to make a correction or to clarify something. During exams I will mention the correction to those in class as well, but those not in class will want to monitor announcements so that they get the information promptly. (In case you are wondering, you can have a smartphone during quizzes and the final, but please make sure it is on silent and that you are not using it to communicate with others - see the policies above.)

While you can use Canvas to send me messages, I prefer if you email me (pbutton@tulane.edu). This will ensure a better and faster response since I check it more often. For whatever reason, I get a lot of spam messages on Canvas (e.g., invitations to seminars in the English department) so I prefer not to use it to communicate with students. I do check my messages on there, just not quite as often.

### **Zoom Information**

Below is the Zoom information for the course. As detailed above you can choose to attend in-person or on Zoom. Almost all classes will allow attendance either in-person or on Zoom. However, if there are classes that have to be run on Zoom only (e.g., I am sick or traveling), or that are in-person only or don’t need to have Zoom on (e.g., the entire class is dedicated to group work), I will make this clear on the page for the course day. Join Zoom Meeting <https://tulane.zoom.us/j/99651877799> Meeting ID: 996 5187 7799

### **Zoom Recordings**

The Zoom lectures are recorded so you can review the recordings later or if you could not make class - see the “Zoom” tab. This is how the students taking the course asynchronously are “attending” this course. Students may not post a class recording elsewhere, either wholly or in part.

### **In-Person, Remote, and Asynchronous Attendance Policies**

Success in this class requires that you attend class regularly, either in person or on Zoom (your choice in most cases). (For those of you taking the course asynchronously, you would

just need to watch the lecture recordings regularly.) This is important because I will regularly cover material that is not in the assigned readings or I will cover it differently. A lot of the course material is of my own doing and doesn't have a direct parallel in an assigned reading. My course includes both traditional lecturing and some in-class activities, and participating in these activities is important to achieving the learning outcomes. In addition, important announcements regarding the course may be made during class, although I almost always make these on Canvas as well. Part of the class also involves you giving and receiving feedback on your work, and your participation will help you and others improve.

For those attending the course on Zoom, you will get nearly the same experience (I hope). You will be able to ask questions and participate on Zoom. I show everything on the computer screen and use screen-share on Zoom, so you won't miss anything such as me writing on a whiteboard that is not (easily) visible on Zoom. One minor issue can sometimes be that it is hard to hear what other students in the class (who are not on Zoom) say. This is because sometimes keeping the student microphones on, so these students can be heard, leads to bad audio quality when I am talking, so I have to constantly turn on and off the student microphones to optimize audio quality. I am not able to do this perfectly all the time. I generally repeat student questions so that I can ensure that everyone heard them and ensure that I interpreted what was said correctly. The only more substantive thing you may miss by not attending in person is some activities that can only be done in person (as detailed above in the ["Activities" sub-section](#), these would be modified to allow you to do them another way or would be dropped for you if you are a Zoom-only student).

You do not need to inform me beforehand if you plan to attend through Zoom unless you have any questions or concerns. You will be able to see on Canvas a page under "Modules" for each course day, and this will detail what will be covered and if there will be an in-class activity, and to what extent that can be done on Zoom or done asynchronously. You will not face any penalties for attending via Zoom instead of in person, other than having a different experience which may or may not be better for you. I will not track who uses which option or how often.

You may not be able to attend some classes in-person or on Zoom, and that is ok. You can watch the lecture recording later. If there was an in-class activity, then you often can do it later - the page for each course day under "Modules" will explain this. If it is not possible to do the activity, or a modified version of it, then it can be one of the two activities that you can "drop" without it affecting your activity grade (and this activity would be dropped for the asynchronously-only students as well.)

## Deadline Flexibility

Unless otherwise noted, deadlines for everything except quizzes, some activities, and the final exam are flexible. However, unless alternative arrangements are made, there is a **hard** deadline of **May 6** to submit everything, except there is a slightly extended deadline of up until **May 9** to submit optional revisions to the short research proposal.

All work must be completed by those **hard** deadlines, otherwise it will get a zero. (The only exception would be if we arranged for you to take a temporary "incomplete" grade or we made some other arrangement in advance.)



The syllabus and Canvas show the recommended deadlines listed above. Assignments submitted on Canvas past these deadlines will be automatically marked as “late” by the Canvas system but this has no affect on your grade. Please ignore this. There are no late penalties outside of the hard deadlines listed above.

These recommended deadlines are suggested so that you can keep consistent progress. If you wait until April or May to do the first two assignments or most of the activities, you will have less time to receive feedback from me or others or ask for help if you get stuck. I will be able to provide more detailed, useful, and timely feedback if you try to follow the suggested schedule.

The quiz times are fixed. I may be able to have you take a quiz at a slightly different time if that is arranged at least a week before (if at all possible). However, I cannot guarantee this. (Students taking the course asynchronously should contact me at least a week in advance to schedule a time to take a quiz).

## Regrading

Students may ask that a quiz, exam, or assignment be regraded if they feel that a mistake has been made by giving me a request via email or on Canvas explaining the reasoning behind why there was a grading error. Please do not come up to me before, after, or during class to ask me to regrade a question unless it is simply an addition error. I cannot and will not re-grade “on the spot” as I need more time to carefully consider your situation without feeling under pressure.

If I do decide to regrade the assignment or exam, then the entire item will be regraded. After regrading, the grade may rise or fall. Students who are fishing for points typically have no change on average, although some have had scores go down. Those with legitimate concerns sometimes get an increase. Please note that regrading quizzes and exams may not be possible for students who take their quizzes or exams in pencil.

## Code of Academic Conduct

The Code of Academic Conduct applies to all undergraduate students, full-time and part-time, in Tulane University. Tulane University expects and requires behavior compatible with its high standards of scholarship. By accepting admission to the university, a student accepts its regulations (i.e., [Code of Academic Conduct](#) and [Code of Student Conduct](#)) and acknowledges the right of the university to take disciplinary action, including suspension or expulsion, for conduct judged unsatisfactory or disruptive.

I take matters of academic honesty very seriously. A student who commits academic dishonesty disrespects the hard work of their classmates. Any student found cheating, plagiarizing, or improperly colluding during the course will be subject to possible disciplinary action as outlined in the Code of Academic Conduct and the Code of Student Conduct. If you fall behind in your coursework and even feel tempted to cheat, please see me first to see if we can find solutions.

Unless I indicate differently on instructions, such as with the assignments and some activities, all work must be completed individually. Any resources used or referenced in

assignments and even the open-book quizzes and final exam in the course must be cited. Please see a discussion of this above under the sub-section “Open Book” Exams, Citations Requirements, and Preventing Plagiarism. If you have any question about whether a resource is acceptable or how to cite it, please ask me during the exam or whenever and I would be glad to help.

### **Proper Use of Generative AI**

Generative AI tools such as ChatGPT, Elicit, and Consensus can be very useful. I am looking forward to continuing to learn how to better use them myself. However, we have to ensure that we use these tools in an ethical manner - namely, avoiding plagiarism which could more easily happen when using generative AI to help answer exam or assignment questions or help with research. Please note that while I allow these tools to be used, with restrictions, for quizzes, assignments, and the final exam, each professor can set their own policies on to what extent AI tools can be used in their course.

My restrictions on the use of generative AI is basically the same as for any other resource: if you use generative AI, but you must cite it correctly. My suggestion is to cite the AI's output following the standards in the [Chicago Manual of Style](#). Something like “ChatGPT, response to “Explain what a differences-in-differences regression is.,” OpenAI, March 17, 2024, <https://chat.openai.com/chat>.” would be great.

In many cases, the answer provided by generative AI is not useful and you choose not to use it. Generative AI can often provide incorrect, misleading, or useless answers, and this may especially be the case in this course for questions that are more of a problem solving nature. One of the in-class activities we will likely do in the course is use Consensus, a generative AI research “search engine” to see to what extent it is useful or not at answering the types of questions we might have in this course and in helping us find relevant research. I am curious to see the results! Note that if you do not use any part of the generative AI's output but you do look up one of the sources it provides, and you use one of those sources, then please cite those sources as you would normally.

### **ADA, Accessibility, and Inclusivity Statements and Supports**

Tulane University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability, please let me know immediately so that we can privately discuss options. I will never ask for medical documentation from you to support potential accommodation needs. Instead, to establish accommodations, I may request that you register with the Goldman Center for Student Accessibility. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. Goldman Center contact information: [goldman@tulane.edu](mailto:goldman@tulane.edu); (504) 862-8433; <https://accessibility.tulane.edu/>.

While it is ideal to work with Goldman to get the best support and accommodations as

possible, I understand from both personal and research experience that disability, health, and accessibility concerns are complex and can appear suddenly, be stigmatized, etc. This is all to say that you may not have an accommodation established yet through Goldman but could still require one, and I may be able to provide one. Please ask for what might help in these regards - I am here to help you and this is very important to me personally.

Below are some related ways I am trying to make my course for accessible:

## **Mental Health**

There are many other barriers to learning that I want to remove. For example, students may experience mental health issues during their time at Tulane. Sometimes these mental health concerns are dealt with formally, such that students work through the Goldman Center to get needed accommodations. But oftentimes these situations appear and haven't yet been dealt with in a formal way. As someone who sometimes struggles with mental health issues, I understand how mental health issues can be a significant barrier to the ability to learn. I want to work with students who have situations that may or may not be documented to see what we can do to reduce any barriers to learning and to ensure that students can take care of their health in addition to performing in the course. If you have facing barriers to your learning, please let me know what I can do to help. I do not need to know health-related details and I respect your privacy. Coming to me earlier usually allows me to be of better help, but I can attempt to assist at all stages.

## **Religious Accommodation Policy**

Per Tulane's religious accommodation policy, I will make every reasonable effort to ensure that students are able to observe religious holidays without jeopardizing their ability to fulfill their academic obligations. Excused absences do not relieve the student from the responsibility for any course work required during the period of absence. Students should notify with two weeks notice, preferably within two weeks of the start of the semester, about if their intent to observe any holidays that fall on a class day would require that they miss class or require some other accommodation.

## **Policies on Children in Class**

(Adapted from Dr. Melissa Cheyney's syllabus posted here: <https://studentlife.oregonstate.edu/childcare/family-friendly-syllabi-examples>) It is my belief that if we want women and parents in academia, that we should also expect children to be present in some form. Currently, the university does not have a formal policy on children in the classroom that I am aware of. The policy described here is thus a reflection of my own beliefs and commitments to students.

1. First, note that this course always allows you to attend remotely, via Zoom, which could help address any of these childcare (or eldercare) concerns.

2. All exclusively breastfeeding babies are welcome in class as often as is necessary to support the breastfeeding relationship. Because not all women or those who breast-feed can pump sufficient milk, and not all babies will take a bottle reliably, I never want students to feel like they have to choose between feeding their baby and continuing their education. You and your nursing baby are welcome in class anytime.
3. For older children and babies, I understand that minor illnesses and unforeseen disruptions in childcare often put parents in the position of having to choose between missing class to stay home with a child and leaving them with someone you or the child does not feel comfortable with. While this is not meant to be a long-term childcare solution, occasionally bringing a child to class in order to cover gaps in care is perfectly acceptable. You will likely find it better to attend on Zoom, however.
4. I ask that all students work with me to create a welcoming environment that is respectful of all forms of diversity, including diversity in parenting status.
5. In all cases where babies and children come to class, I ask that you sit close to the door so that if your little one needs special attention and is disrupting learning for other students, you may step outside until their need has been met. Non-parents in the class, please reserve seats near the door for your parenting classmates.
6. Finally, I understand that often the largest barrier to completing your coursework once you become a parent is the tiredness many parents feel in the evening once children have finally gone to sleep. The struggles of balancing school, childcare and often another job are exhausting! I hope that you will feel comfortable disclosing your student-parent status to me. This is the first step in my being able to accommodate any special needs that arise. While I maintain the same high expectations for all student in my classes regardless of parenting status, I am happy to problem solve with you in a way that makes you feel supported as you strive for school-parenting balance.

## **Title IX and Harassment, Discrimination, and Gender or Sexual-Based Violence**

### **Title IX**

Tulane University recognizes the inherent dignity of all individuals and promotes respect for all people. As such, Tulane is committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, intimate partner violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available: you can learn more at <https://allin.tulane.edu/>. Any and all of your communications on these matters will be treated as either “Confidential” or “Private” as explained in the chart below. Please know that if you choose

to confide in me I am required by the university to share your disclosure in a Care Connection to the Office of Case Management and Victim Support Services to be sure you are connected with all the support the university can offer. The Office of University Sexual Misconduct Response and Title IX Administration is also notified of these disclosures. You choose whether or not you want to meet with these offices. You can also make a disclosure yourself, including an anonymous report, through the form at [tulane.edu/concerns](http://tulane.edu/concerns).

Confidential	Private
<p><i>Except in extreme circumstances, involving imminent danger to oneself or others, nothing will be shared without your explicit permission.</i></p> <ul style="list-style-type: none"> <li>▪ Counseling &amp; Psychological Services (CAPS)   (504) 314-2277</li> <li>▪ The Line (24/7)   (504) 264-6074</li> <li>▪ Student Health Center   (504) 865-5255</li> <li>▪ Sexual Aggression Peer Hotline and Education (SAPHE)   (504) 654-9543</li> </ul>	<p><i>Conversations are kept as confidential as possible, but information is shared with key staff members so the University can offer resources and accommodations and take action if necessary for safety reasons.</i></p> <ul style="list-style-type: none"> <li>▪ Case Management &amp; Victim Support Services   (504) 314-2160 or <a href="mailto:srss@tulane.edu">srss@tulane.edu</a></li> <li>▪ Tulane University Police (TUPD) Uptown - (504) 865-5911 Downtown – (504) 988-5531</li> <li>▪ Office of University Sexual Misconduct Response and Title IX Administration   (504) 865-5611 or <a href="mailto:msmith76@tulane.edu">msmith76@tulane.edu</a></li> <li>▪ Student Affairs Professional On-Call (24/7)   (504) 920-9900</li> </ul>

**“Lauren’s Promise”:** I will listen and believe you if someone is threatening or harassing you. Lauren McCluskey, a 21-year-old honors student athlete, was murdered on Oct. 22, 2018, by a man she briefly dated on the University of Utah campus. *We must all take action to ensure that this never happens again.*

### American Economic Association Policy on Harassment, Discrimination, and Retaliation

The American Economic Association (AEA) seeks to create a fair and safe environment for all economists, and in 2018 adopted the [AEA Code of Professional Conduct](#) and the [AEA Policy on Harassment, Discrimination and Retaliation](#). Please review these policies and respect them. It is also important to review these policies so that you know what sorts of actions are deemed unacceptable by the AEA in any AEA spaces or events (e.g., conferences, AEA-funded programs). Many organizations similar to the AEA (e.g., the NBER, APPAM) have similar policies.

I would also like to stress how even what might seem like “small” violations of the policies, such as unwanted lewd comments, unwanted touch, or offensive statements, can lead to very challenging environments for other economists. This has manifested in the field of economics being known for having worse issues with professional climate, and having

much less diversity - broadly defined - than most other academic fields - including most other STEM fields. For example, economists who are women, LGBTQ+, and from minoritized racial or ethnic groups were more likely to report in the [2018 AEA Climate Survey](#) and in other research (e.g., [Bayer et al. 2020](#)) that they avoided economics events, changed research topics, or dropped out of the profession due to discrimination or harassment.

For those who are a victim of a violation of these AEA policies, or witness a violation, there are three resources, detailed below, that can help you determine your options. (These three options do not exclude other possibilities that may be available to you, such as, e.g., contacting law enforcement or taking legal action.)

### **AEA Ombuds Resource**

Those who may have been a victim of, or witnessed, a violation of the [AEA Code of Professional Conduct](#) or the [AEA Policy on Harassment, Discrimination and Retaliation](#) can access a useful resource: the [Ombuds Team](#). This is a team that is hired by the AEA but is independent from them, and provides independent, impartial, and confidential services for those with questions or concerns related to AEA policies. I have personally used their services in the past and they were very helpful. You can find more information, including an introductory presentation, and FAQ, and contact information for their team, on their website: <https://www.mwi.org/aea-ombuds/>.

### **Reporting Lockbox**

The AEA Ombuds manages the soon-to-be-created Reporting Lockbox, which is a secure reporting system whereby an AEA Member can “confidentially report conduct or circumstances of potential violations of the AEA Policy on Harassment, Discrimination, and Retaliation (“Policy”) or the AEA Code of Professional Conduct by another AEA Member (a “person of concern”).” (see <https://www.mwi.org/aea-ombuds-faqs/#22>, accessed Dec. 26, 2023) Reports submitted are kept confidential - the AEA does not have access to these reports. This is not the same as filing a formal complaint with the AEA (see below). The only time your report is ever released from the Reporting Lockbox is, if someone else files a report on the same situation or individual and *with your consent only* you decide to share your Lockbox report with them.<sup>1</sup> The Reporting Lockbox could be useful if you want to have a record of a concern or situation and/or are not ready to pursue action now. It also helps as an alternative to the “whisper network.”<sup>2</sup> The Reporting Lockbox is not currently active yet but will be soon (I am in contact with them.)

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<sup>1</sup>The Ombuds does, however, anonymize the reports and aggregates them to present trends to the AEA leadership, such as incidents over time and incidents by type.

<sup>2</sup>Often women and others discuss situations and “bad actors” with others in their networks to protect each other. Sometimes an individual has been mentioned frequently or with enough severity within a “whisper network” to be known as problematic - to say the least. The Reporting Lockbox could be a useful complement to this by providing a more formal way to connect individuals with similar concerns or who have faced similar situations - who may or may not be able to find each other through a “whisper network.”



### Filing a Formal Complaint with the AEA

The AEA’s explains their process for filing a formal complaint here, at <https://www.aeaweb.org/about-aea/aea-policy-harassment-discrimination/formal-complaint> (accessed Dec., 26): “AEA members may file a formal complaint about another member, or about conduct in connection with an AEA-sponsored activity, if they believe the AEA Policy on Harassment, Discrimination, and Retaliation and/or the AEA Code of Professional Conduct have been violated.” As the AEA suggest, you may also want to consider filing a complaint with entity responsible for overseeing the person’s conduct (e.g., their university). Both me and the AEA would also recommend discussing your plans with the AEA Ombuds before filing a report to ensure you are making the best decision for yourself. They can also answer questions about the process of filing a formal complaint with the AEA.

### Tulane Emergency Preparedness and Response

EMERGENCY NOTIFICATIONS: TU ALERT	SEVERE WEATHER
<p>In the event of a campus emergency, Tulane University will notify students, faculty, and staff by email, text, and/or phone call. You were automatically enrolled in this system when you enrolled at the university.</p> <p>Check your contact information annually in Gibson Online to confirm its accuracy.</p>	<ul style="list-style-type: none"> <li>▪ Follow all TU Alerts and outdoor warning sirens</li> <li>▪ Seek shelter indoors until the severe weather threat has passed and an all-clear message is given</li> <li>▪ Do not use elevators</li> <li>▪ Do not attempt to travel outside if weather is severe</li> </ul> <p>Monitor the Tulane Emergency website (<a href="http://tulane.edu/emergency/">tulane.edu/emergency/</a>) for university-wide closures during a severe weather event</p>
ACTIVE SHOOTER / VIOLENT ATTACKER	EVERBRIDGE APP
<ul style="list-style-type: none"> <li>▪ <b>RUN</b> – run away from or avoid the affected area, if possible</li> <li>▪ <b>HIDE</b> – go into the nearest room that can be locked, turn out the lights, and remain hidden until all-clear message is given through TU ALERT</li> <li>▪ <b>FIGHT</b> – do not attempt this option, except as a last resort</li> <li>▪ For more information or to schedule a training, visit <a href="http://emergencyprep.tulane.edu">emergencyprep.tulane.edu</a></li> </ul>	<ul style="list-style-type: none"> <li>▪ Download the Everbridge app from the App Store or Google Play store</li> <li>▪ The Report feature allows you to silently and discreetly communicate with TUPD dispatchers</li> <li>▪ The SOS button allows you to notify TUPD if you need help</li> <li>▪ The Safe Corridor button serves as a virtual escort and allows you to send check-in notifications to TUPD</li> </ul>

From: Tulane Office of emergency preparedness and response



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