ECO372H1F: Data Analysis and Applied Econometrics in Practice
Section LEC5101 — Fall 2025
Department of Economics, University of Toronto

Instructor

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TA for Tutorials

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Class information

Lectures: Wednesday from 5 PM to 7 PM in BL 205
Tutorial: Wednesday from 7 PM to 8 PM in BL 205
Instructor Office Hours: TDB in TDB
TA Office Hours: TBD, Online
Website: Quercus (Link)

Course description

ECO372 is an intermediate-level course in econometrics which equips students with a modern approach to data analysis and econometrics focusing on the use of data to answer causal questions. I consider answering causal questions to be a function of three parts. (1) Knowing the environment the question is being answered in, (2) knowing which tool to use to answer the question, and (3) knowing how the tool works. We will spend most of our time on (2) and (3) for this course, allowing for math and intuition. Students will learn about different empirical techniques that economists use to answer causal questions: linear regression, random assignment, difference-in-differences, instrumental variables, and regression discontinuity design. Students will learn about applications of these techniques in academic research. Econometric methods will be illustrated using the application of regressions to a wide variety of economic questions and data sources, including the use of statistical software (R).

References

We will be following Scott Cunningham's book, Causal Inference: The Mixtape, quite closely but also spend some time on outside topics. The book is freely available online or a physical copy may be purchased from Amazon or other retailers. We will also be looking at journal articles which illustrate the concepts we are learning in class. I will post these articles on Quercus. I have also listed a few additional textbooks which serve as supplementary reading for the topics in Cunningham's book. However, they are not required.

- **Required**: Causal Inference: The Mixtape by Scott Cunningham (https://mixtape.scunning.com/)
- **Supplementary**:
  - Mastering 'Metrics by Joshua Angrist and Jörn-Steffen Pischke (Princeton University Press, ISBN:978-0-691-15284-4)
  - Introduction to Econometrics, 4th Edition by James H. Stock and Mark W. Watson
  - Introductory Econometrics: A Modern Approach, 7th Edition by Jeffrey M. Wooldridge

Software

We will be using the programming language R and the integrated development environment RStudio in this course. No prerequisite programming knowledge is required. Both R and RStudio can be downloaded and installed by following the instructions at this link: https://posit.co/download/rstudio-desktop/.

Weekly schedule

I will post all materials on our course webpage (Quercus) on **Tuesday evening** for that week's lectures. This includes lecture slides, practice problems, along with any code and data you may need for the week's material. I encourage all of you to come to the lecture prepared by briefly going over the slides and loading any data or code being used.

- **Lectures**: In our weekly lecture I will introduce the econometric theory and show you examples, by way of economic research, of the theory being used in practice. You will want some way to take notes and you should also bring a device which you can use to access R/RStudio. I will often show examples of code in class and for you to get the most out of this you should follow along in real time.
- **Tutorials**: Tutorials will follow similarly to how you may have experienced them in ECO220. Each tutorial will have practice problems relevant to what was covered in the lecture or covered in last week's lecture. These problems will include some theory and working with data in R. As such, you need some way to access R/RStudio during this session. You will have the hour to do the problems, and submit them to Quercus. Each of the 10 tutorial will be worth 1.25% each with your lowest two tutorials dropped. Tutorials are pass / fail.
- **Office Hours**: There are weekly in-person office hours where you can either ask questions about the theory or get help with R. I will also schedule additional office hours before exams. If you are unable to attend the scheduled office hours and you need to talk to me, this can be arranged by sending me an e-mail.

Course evaluation

Your final grade will be based on the following:

Assessment	Weight	Tentative Due Date
Empirical Bridging Module (EBM)	3%	September 11, 9am-11 (up to noon)
Tutorial Problems (8 of your best 10)	10%	End of each lecture, starting September 10th
Assignments (2 in total)	27%	Oct 14 and Dec 2 (at 11:59 PM)
Midterm exam	25%	Oct 22 (in class)
Final exam	35%	TBA (Possible dates are Dec 5–23)

- **Empirical Bridging Module (EBM):** Our course is one of the upper-level ECO courses where students complete an Empirical Bridging Module (EBM) during a two-hour session early in the Fall term. In this session, you practice applying your prerequisite skills to empirical research drawn from academic journals and working paper series by economists. These cases challenge you to apply the empirical tools that you studied in your second-year prerequisite courses and help prepare you for our upper-level empirical course. Your mark is based on demonstrated effort: the goal is active learning, including helping you notice where your prerequisite skills may need some review so that you are set up for your best work in our course. We expect about two hours of your effort, but for those who wish for more time for any reason, including but not limited to accessibility reasons, you may keep working for up to

three hours and the EBM support team will continue to be available until noon to help with your questions. (Note: The EBM is an activity, not a test, so Accommodated Testing Services is not relevant.) If you are enrolled in more than one course doing the EBM, credit automatically applies to all relevant courses. For makeup requests for the EBM please complete https://forms.office.com/r/AtqMrkCfGw, which is an MS Form, as soon as possible. For any EBM related questions, please contact us directly at: ebm.economics@utoronto.ca. Please read all e-mails from that address, which is how the EBM team communicates with students across many courses, including telling you the room number in the Examination Centre (EX) to report to for the EBM.

- **Tutorial Problems**: For an hour at the end of each class (7pm-8pm) you will have the chance to work on a set of problems in R that relate to the course material. These questions will include general data analysis, running regressions, and creating figures. At the end of each tutorial you will submit a PDF of what you have done for a pass / fail grade — only your active participation matters, a showing of effort receives full marks. I will exclude two tutorials when calculating this grade and there is no participation component in the first lecture.

- **Assignments**: You will have two assignments each weighted equally. These will be a combination of theory and code. I will require you to hand in both typed answers in a PDF and a code replication package consisting of .R files. The submission will be online and you will have until 11:59 PM of the day it is due to submit. However, try not to submit too close to the deadline—see the late assignment submission policy below. You are free to collaborate with one another on these but you must hand in your own version of the answers written in your own words.

- **Midterm/Final** A 2 hour midterm will be held on Oct 22 during class. The final will be 2 hours long with the date TBA. Both exams will consist of short-answer questions. Practice exams with solutions will be provided for both.

- **Note on grading - Crowdmark** This course will use Crowdmark, a collaborative online grading tool for marking and providing feedback on graded term assessments. Crowdmark provides efficiencies with grading, data recording, returning term assessments and handling regrade requests. Copies of student work marked in Crowdmark, including grading and feedback, will be available online to students for at least one year. Digital (i.e., online) copies will serve as the authoritative record for course administrative purposes, and paper copies of assessments scanned and uploaded to Crowdmark will be destroyed after the term has ended and final grades are approved. If students have questions about how you information is stored on Crowdmark, please contact me, your course instructor.

How to get a 1% bonus on your final grade

I am dyslexic, so as a start I apologies for errors, know I read through everything many times (including having other people read for me) but things still get missed. If anyone decides to create a list of slide errors for a given lecture you will receive a one percentage point addition to your final grade as long as you follow the following:

- Find at least 10 legitimate errors in a given week's slides

- Send me the list of errors within a week of the lecture taking place including the slide number, the original text and the corrected text

- You can only claim the bonus once for the entire semester

Course coverage

This is the tentative plan for the material.

Week	Date		Textbook chapter(s)
1	Sept 3	Introduction and using R	
2	Sept 10	Probability and Statistics review, Linear Regression	Chapters 1 & 2
3	Sept 17	Causality and Potential Outcomes	Chapters 3, 4, & 5
4	Sept 24	Difference in Difference	Chapters 3, 4, & 5
5	Oct 1	Difference in Difference	Chapters 3, 4, & 5
6	Oct 8	Regressions with Panel Data	Chapters 8 & 9
7	Oct 15	Regressions with Panel Data	Chapters 8 & 9
8	Oct 22	Midterm - IN CLASS	
9	Oct 29	Reading Week - NO CLASS	
10	Nov 5	Instrumental Variables (IV)	Chapters 8 & 9
11	Nov 12	Instrumental variables (IV)	Chapters 8 & 9
12	Nov 19	Regression Discontinuity Design (RDD)	Chapter 6
13	Nov 26	Regression Discontinuity Design (RDD)	Chapter 6

The textbook chapters will be supplemented with journal articles which I will post on Quercus with each week's lecture materials. Also, I will let you know each week which sections of the textbook are particularly relevant for us.

Email Policy

For any questions related to assignments, absences, exams, or general course material you can email me (andrew.paulley@mail.utoronto.ca). Please make the subject of the email: ECO372 - Reason, where "Reason" is replaced by whatever the email is about. I will get back to you within 48 hours throughout the term or 24 hours around assignment and exam dates. If the subject line is not in the formate stated above the email may be missed.

Use of AI / ChatGPT

You may use **generative AI** to help you debug your code or to answer questions about high-level concepts covered in the course. While AI such as **ChatGPT** has improved over the years when it comes to causal inference and statistics it can still get things wrong or simply operate at a minimal level of understanding without a good grasp of the details. Additionally, any written work you submit must be your own and may not include any content from generative AI. Including text (not code) generated by AI in your assignment submissions constitutes the use of an unauthorized aid and is considered an academic offence. I want to encourage you to use these tools for what they are good at—generating code syntax—and discourage you from using them for what they are bad at—explaining model results.

Remark requests

If you believe an error was made in the grading of one of your assessments, either come see me during office hours or book an appointment with me to discuss. Any remark requests must be made within one week of the graded assessment being returned to you. Note that I reserve the right to regrade the entire exam or assignment, and that your grade could go up, down, or be unchanged.

Missed work/late submission

Any **missed work** (assignment or exam) automatically gets a grade of zero. Special considerations can be made for *legitimate* reasons as long as they are communicated to me by e-mail in **advance** (at least 24 hours) prior to the due date. In the case of a missed midterm exam, there will be an opportunity to write a make-up exam under two conditions:

1. You communicate your absence to me via e-mail **in advance** of the midterm.
2. You submit documentation which clearly outlines the reason for missing the midterm. This documentation can be an Absence Declaration (via ACORN) or the University's Verification of Student Illness or Injury (VOI) form.

If these conditions are not met, you will receive a grade of zero on the midterm exam and will **not** be eligible for writing the make-up midterm exam.

Note that **late assignment submissions** are also considered "missed" work and will be subject to the zero-grade penalty. Do not wait until the last minute to submit your assignments as there will be no leeway on this.

Accessibility

If you require any additional accommodations or have any accessibility concerns, please reach out to Accessibility Services (http://www.studentlife.utoronto.ca/as) as soon as possible.