Health Econometrics I

HAD 5744
Fall 2022

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Class time and location: Fridays, 1pm-3pm.

Office hours: Book appointments at calendly.com/Hoagland-office-hours/had5744-2022f
- In-person: Fridays, 9:00-11:00am.
- Zoom: Tuesdays and Wednesdays, 10:00am-10:30am (or by appointment)
  https://utoronto.zoom.us/my/hoaglandzoomroom

Course Description: Introduces econometric methods frequently used in the social sciences. The principles covered underlie much of applied health economics, applied health policy, and health services research. In many applications, researchers want to understand a process by which data and outcomes are generated; however, many data generating processes (DGPs) are possible given observed data. This course deals with how to determine *which* DGPs, and hence which "story", has generated your data. The course uses applications of statistical tests and procedures in the context of distinguishing between models and explores the applications of a range of frameworks to the types of questions addressed by social scientists and health services researchers. It is assumed that students have a basic (graduate) training in statistics.

Evaluation Criteria
- Assignments: 3 assignments, each worth 20% of the final grade.
- Major Paper: worth 40% of the final grade.

Assignments are to be completed using R or STATA. Assignments and data sets will be posted on the course website. Due dates are listed on the schedule below. The assignments **must be submitted via email** before class on the due date; late assignments will be penalized at the rate of 10% per day. Please submit your assignment with the file name "Econometrics_AssignmentX_LastName" (e.g., X = 1, 2, 3).

Major paper**:** The paper provides students with an opportunity to undertake an investigation of a research question of their own choosing on a self-contained topic within the fields of health economics or health services research. Writing will also help with communication skills and familiarization with the structure of journal manuscripts. **Students are expected to pair up in groups of either two or three to produce a paper.**

If the students do not already have access to a working data set, they can use publicly available survey data. For example, there are public use files for the Canadian Community Health Survey or CCHS along with a wide range of other health related surveys available for download through the University of Toronto Data Liberation Initiative at CHASS (http://sda.chass.utoronto.ca/).

Students will hand in an outline of their major paper due October 21. The major paper must include a brief introduction and literature review, description of data, variables, and methods employed. The final paper should include these as well as results, discussion and conclusion. The paper should be presented in the form of a journal manuscript (either health economics/policy or clinical). The final paper is due December 8.

Course website: This course has a Github repository that contains all relevant materials; you can access the repo at https://github.com/alex-hoagland/HAD5744_2022F. Each lecture has a folder containing the slides, code, and example papers. The assignments folder contains the relevant questions and data sets. Materials may be updated and/or added throughout the semester.

Software: We will make use of R and RStudio. You do not need a license for R or RStudio and it can be downloaded for free at https://www.r-project.org/ and https://rstudio.com/. Learning R or any program for the first time can be frustrating. Sometimes you can get really bogged down from not knowing a simple command or syntax. This is normal, and part of the learning process. The best way to learn is by relying on the built-in help functions, online short tutorials, class participation or by taking a short course. I am happy to respond to specific questions during the office hours and during class.

I recommend these slides as a good starting guide for R: https://nickch-k.github.io/EconometricsSlides/Week_01/Week_01_Slides_2_Starting_R.html#1

R is only one software that can perform the analyses we will cover in class; you are free to use your preferred choice of statistical software. If you want to use STATA you can purchase a one-year license for US $125 through Stata's Grad Plan: https://www.stata.com/order/new/edu/gradplans/. To learn more on how to use STATA you can refer to the website FAQs (http://www.stata.com/support/faqs/), the links posted on the "Resources for learning STATA" website (http://www.stata.com/links/resources1.html). There are also Stata instructional videos on YouTube and other sites (e.g., DataCamp).

An introductory 2-hour R session will be offered on September 16 and an introductory session on STATA will be offered on September 23 by the Canadian Centre for Health Economics (CCHE) as part of the CCHE Friday seminar series from 10:00 a.m. to 12:00 p.m. You are strongly encouraged to attend these sessions (and the remainder of the seminar series!)

Required texts: Both books have a free e-book version or are relatively cheap buys on Amazon. I *highly* recommend owning print copies if you plan to pursue applied research – they are both very handy. **Course readings are expected to be completed prior to class.**
- "The Effect," Nick Huntington-Klein (NHK).
- "Causal Inference: The Mixtape," Scott Cunningham (SC).

Additional (non-required) reading:
- "Principles of Econometrics, 5th edition", R. Carter Hill, William E. Griffiths and Guay C. Lim (HGL).
- A useful online resource: https://tinyurl.com/bdzxbxce
- Example papers for each method are included in the Github repo.

Course Schedule

Session #	Date	Lecture / Readings *Recommended readings in italics*	Assignments Due
1	Sep. 9	**Econometric Philosophies: DAGs and Potential Outcomes** • SC Introduction, Chapters 2-3 (p. 96-148) • *HK, Chapters 1-9 (very helpful foundations for those interested)* • *HGL, Chapter 1*	
2	Sep. 16	**Probability + Coding Review, Univariate OLS** • SC, Chapter 1 (p. 16-58) • HK, Chapter 4 • *HGL, Chapters 2-3*	
3	Sep. 23	**Multivariate OLS I: Setup & Inference** • SC, Chapter 1 (pg 63-95) • HK, Chapter 12-13 (pg. 175-200) • *HGL, Chapter 4-5*	
4	Sep. 30	**Multivariate OLS II: Additional Topics** • HK, Chapter 13 (pg. 201-266; can omit pages 226-232) • *HGL, Chapter 6-8 (omit from section 7.5.1 to end of chapter)*	
5	Oct. 7	**Matching Methods** • SC, Chapter 4 (p.175-240) • HK, Chapter 14	Assignment 1 due
6	Oct. 14	**Instrumental Variables and Moment-Based Estimation** • HK, Chapter 19 • SC, Chapter 7 (p. 315-385) • *HK, Chapter 9 (more theory on front-door approaches)* • *HGL, Chapter 10-11*	
7	Oct. 21	**Limited Dependent Variables I, Binary, Count Data, Hurdle Models** • HK, pages 226-232 • *HGL, Chapter 16*	Major paper outline due
8	Oct. 28	**Limited Dependent Variables II: Multinomial Logit** **(Possible Catch-Up Day)**	

9	Nov. 4	**Panel Data & Difference-in-Differences** • HK, Chapter 18 • SC, Chapter 9 (p. 406-510) • *SC, Chapter 8 (will cover panel data in more detail next semester)* • *HGL, Chapter 7 - from section 7.5*	Assignment 2 due
10	Nov. 18	**Synthetic Controls & Quantile Regression <mark>(by Zoom)</mark>** • SC, Chapter 10 (p. 511-539) • HK, Section 21.2.1 (pages 555-559)	
11	Nov. 25	**Catch Up and Additional Topics in Research Methods** *Readings TBA*	
12	Dec. 2	**Additional Topics in Research Design**	Assignment 3 due