SYLLABUS

SPECIAL TOPICS IN ECONOMICS WITH DATA ANALYTICS

UNIVERSITY OF TORONTO
DEPARTMENT OF ECONOMICS

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Semester: Fall 2024
Lecture and Tutorial: Thursdays from 2pm to 5pm
Classroom: FE24

E-mail is the best way to reach us. Please include **ECO481H1** in the e-mail subject and your name in the message and allow up to 24 hours for a reply.

Teaching material:

- Lecture slides
- Sample computational and empirical exercises accompanied by scripts/programs

Suggested reading materials:

- "Introductory Econometrics. A Modern Approach", Wooldridge, Jeffrey M. Cencage Learning.
- "Mostly Harmless Econometrics. An Empiricist's Companion", Angrist, Joshua D. and Jorn-Stephen Pischke. Princeton University Press.
- "Microeconometrics Using Stata", Cameron Colin A. and Pravin K. Trivedi. Stata Press.
- "Dynamic General Equilibrium Modeling" Heer, Burkhard and Alfred Maußner. Springer
- "Numerical Methods in Economics", Kenneth L. Judd, MIT Press.
- QuantEcon Lectures available at https://python.quantecon.org/index_toc.html

Course description:

This course exposes students to the macro-labour literature that studies labour market outcomes (e.g. employment flows, earnings dynamics, inequality) and how they interact with government (fiscal/monetary) policy. It will highlight the role of household heterogeneity in the study of these topics and the increasing importance of using microdata to inform models used for policy evaluation. In the process, students are trained to become skilled users of complex

microdata which, combined with empirical methods, can be used to establish relevant empirical patterns and relationships. This will enable students to think more critically about existing research and develop their own project/research agendas.

It is divided into two parts. The first part focuses on learning about empirical methods and gaining familiarity with widely-used macroeconomic and microeconomic data sources. Importantly, students will learn how to apply these methods and tools on microdata to establish empirical patterns and causal relationships. The second part focuses on learning about computational methods to solve macroeconomic models. The objective here is to gain theoretical insights that are testable against microeconomic data and useful to inform policy makers. In both parts, students will be given demonstrations on how microeconomic data can be utilized in applied and macroeconomic research, public policy, and private sector work.

Expected learning outcomes:

Students will learn how to process and analyze real-world data, how to test causal relationships and establish empirical patterns, and how to solve macroeconomic models. In doing so, students will also gain familiarity with statistical software such as Stata and commonly used programming languages such as Python. At the end of the course, students are expected to be gain a mastery of using complex datasets to answer a wide variety of questions – a skill that will be valuable for a wide range of organizations be it academic, public, or private.

Prerequisites:

Knowledge of basic econometrics is required. Basic knowledge of programming is a plus but not required. I will share sample codes and analysis during the class to help students.

Coding language use:

For the empirical portion of the class, I will primarily be using Stata. For the quantitative portion of the class, I will be primarily using Python. Students are encouraged to use the same languages to capitalize on materials provided by the instructor and TA. However, students who have a strong preference for other languages are free to code in the language of their choosing.

Course requirements:

There will be three problem sets and a final report. Class attendance is not mandatory but is highly recommended.

- **Class attendance:**
    - Class will include lectures, data demonstrations, and coding exercises. Being able to attend in-person will deliver are higher-quality learning experience for students given the hands-on nature of the class.
    - Each attendance will be worth 1.25% of the student's grade (must complete at least 8 attendances after the first class out of the 11 weeks).

- **Problem sets**:

- Each assignment will ask students to implement lecture material taught during class and extend/develop new programs that build on example codes taught during class.
- Assignments are due at the beginning of class on a specified week. *No late assignments will be accepted*.
- Students are encouraged to learn from each other and discuss problem set questions. However, students must submit their *own* homework. Students are discouraged from writing the entire code with others as they need to gain confidence in writing programs on their own. I strongly recommend working on coding individually while exchanging ideas on specific issues and roadblocks with others.

- **Proposal presentation and final briefer:**
  - Students will be asked to make a short in-class presentation and submit a short proposal outlining a topic they would like to explore using the data and techniques they learn about in class. The objective is to write a short briefer on that topic, applying the tools and knowledge they have learned. The proposal will outline their question, the data and methods they intend to use, and the output they intend to produce. The objective of the proposal presentation is twofold: that the instructor be able to assess its content and feasibility and that peers can provide feedback.
  - Please plan for the date of the proposal presentation.
  - Details on the requirements for the briefer will be announced in class.
  - The proposal presentation as well as students' participation in terms of giving feedback will be graded.

Evaluation:

- Three (3) Problem Sets: 15% x 3
- Class attendance: 10%
- Proposal presentation and feedback provision: 5%
- Final Report: 40%

TENTATIVE CLASS SCHEDULE

Below is a tentative schedule of the topics that the class will attempt to cover. This is subject to change depending on pace and student feedback/interest.

Class	
1	Introduction to Microdata in Macro Models, Microdata on Labour Markets
2	Other Applications of Cross-sectional Data
3	Microdata on Income and Wealth (CIS, SFS)
4	Panel Data (CPS, SIPP, PSID), Administrative Data
5	Panel Data - Labor market flows
6	Panel Data - Identifying unemployment spells

7	Panel Data - Earnings dynamics
8	Proposal Presentation
Reading Week	
9	Introduction to Quantitative Models - Bridging Micro to Macro
10	Model of Labor Supply
11	Model of Job Search
12	Final Report Presentation