KPHD-525: Data-Driven Economic Theory

Spring 2024

Instructor: George Georgiadis

Meeting Time & Location: Wednesdays 9-12pm (GH 5301)

Office Hours: Stop by GH4223 or email me at g-georgiadis@kellogg.northwestern.edu to schedule an appointment.

Course Description:
Over the past 50 years, applied theorists have tackled many important and practical questions: For example, how should an employer design an incentive scheme when workers’ efforts are not contractible? How should a government design its tax schedule? How should a firm design a selling mechanism for a basket of goods? How should a planning authority match medical residents to hospitals? While many papers shed light on novel mechanisms, analyze important trade-offs, and help rationalize economic phenomena, most stop short of providing a compelling way to use available data to answer these questions in real settings. This course focuses on “data-driven” economic theory—papers whose models have been designed to answer such prescriptive questions given the realities of available data and the knowledge available to a designer. We will cover papers from several literatures including contract theory, mechanism design, auctions, market design, internal labor markets, taxation, and social insurance. Deliverables include several presentations—a central goal of this course is to hone your presenting skills, and a paper project that may form the basis for a 2nd or 3rd-year paper.

Target Audience:
MECS and economics Ph.D students, as well as marketing, operations, accounting, and finance students interested in applied economics.

Goals:
This class has three main objectives. The first is to familiarize you with research across various literatures that straddles theory and empirics. The second is to teach you to become a thoughtful applied theory researcher. The final objective is to hone your presentation skills. Presenting your work at seminars and conferences is the primary way to disseminate it, making this a crucial skill. Towards these goals, you will give several 45’ presentations of published or late-stage working papers, and do a data-driven theory project (in teams of up to 2), where you must motivate a problem, develop a framework and explain what data is needed to operate it, provide preliminary results, and present a plan to complete the paper. (The aim is to help you kickstart a data-driven theory paper.)

Format: Each 3h class will consist of app. 90’ lecture and two 45’ student presentations.
Deliverables:
- Five (give or take) 45’ presentations during weeks 2-9. You can pick among the papers below marked with (*).
- A paper project: You (in teams of up to 2) must come up with an idea for a data-driven theory paper, explain why it is interesting, design a framework, explain what data is needed to operate it, provide preliminary results, and come up with a plan to complete the paper. The write-up of the project is due at the end of week 9, and you will present it in week 10.

Topics:
- i. Contract theory (draws papers from economics and marketing)
- ii. Mechanism design and auctions (draws papers from economics and computer science)
- iii. Market design, matching, and internal labor markets
- iv. Taxation & social insurance
- v. Artificial intelligence

Guest Lecture:
On May 8, Martino Banchio (Google Research) will give a guest lecture on algorithmic pricing, artificial intelligence, and reinforcement learning.

List of Papers: (preliminary & incomplete)
Methodology & Survey Papers (Mandatory readings)
**Recommended readings:**
- **Textbook:** On writing well: The classic guide to writing nonfiction by William Zinsser [Link]
- How to write an introduction, a theory paper, and a model by Simon Board and Moritz Meyer-Vehn [Link]

**ChatGBT–Personnel & Organization Economics chatbot:** [https://chat.openai.com/g/g-Zs323kPtm-personnel-organization-economics-insights](https://chat.openai.com/g/g-Zs323kPtm-personnel-organization-economics-insights)

**Contract theory** (draws paper from economics and marketing)

**Mechanism design and auctions** (draws papers from economics and computer science)


**Market Design, Matching & Internal Labor Markets**


**Taxation & Social Insurance** (draws papers from public economics)


