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NBER Digital Economics and AI Tutorial

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Course of Graduate Study

I am a Ph.D. student in Economics at the Massachusetts Institute of Technology, where I enrolled in Fall 2023 and expect to graduate in 2029. I specialize in econometrics and industrial organization. My graduate training includes econometric theory, statistics, theoretical and empirical industrial organization, mechanism design, and machine learning. These fields provide complementary perspectives on how people make decisions and how researchers can draw credible conclusions from data.

Research Interests and Projects in Progress

Research interests: Econometric theory; statistical decision theory; causal inference and policy evaluation; industrial organization; Economics of artificial intelligence and digital markets.

My research to date has focused primarily on econometrics and economic theory. My recent work on human and AI decision making reflects my growing interest in the economics of AI.

Misspecification-averse estimation. A central question in my work with Isaiah Andrews and Ricky Li is how a researcher's attitude toward misspecification should guide the choice of estimator. Using axiomatic tools from the theory of choice under ambiguity, we relate researchers' preferences to criteria for evaluating estimators when the likelihood may be wrong. We introduce a constrained multiplier criterion that combines restrictions on possible misspecification with a penalty for departures from the model. For this criterion, we establish a local asymptotic minimax bound and characterize estimators, including feasible plug-in procedures, that attain it asymptotically.

Certification design. In joint work with Mikael Mäkimattila and Ryo Shirakawa, we study the design and pricing of certification contracts in a theoretical model. In the model, a certifier offers a menu of tests to a sender who has partial private information about an unknown state and seeks to persuade a receiver. We study how the design and pricing of these tests interact with the sender's private information and incentives to persuade. The project brings together mechanism design and information economics to understand the role of certification in strategic communication.

[1] This application was prepared with assistance from ChatGPT (OpenAI) and Claude (Anthropic).

Exact synthetic control. My work with Alberto Abadie examines the geometry of predictor-weight choice in synthetic control. Using tools from convex geometry, we characterize the method's solutions and have developed efficient computational algorithms and accompanying software.

Human and AI decision making. Together with Nikhil Agarwal, Ashesh Rambachan, and Simon Hodson, I study differences between human and AI decision making and explore how the two can be combined. Questions we are interested in pursuing include when human and AI judgments complement one another and how to evaluate decisions that combine both sources of information.

Developing Interests and Motivation for the Tutorial

I am interested in AI both as a subject of economic research and as a tool for empirical analysis. These two perspectives motivate the research directions I hope to develop further through the tutorial.

One direction concerns the economic design of AI systems, including which capabilities to develop and how much computation to allocate at inference time. I would like to study the trade-offs among decision quality, computational cost, and response time, and how the appropriate balance depends on the task and the consequences of errors. I am also interested in how users' preferences for accuracy, speed, and price shape firms' choices about which capabilities to offer and how much computation to devote to different tasks.

A second direction concerns using large language models to construct economic measures from text and other unstructured data. I would like to study how to validate these measures and assess their sensitivity to the choice of model and prompts. I am also interested in how measurement error in LLM-generated variables affects estimation and inference, and how econometric methods can account for that uncertainty.

The NBER tutorial and associated Digital Economics and AI meetings would give me an opportunity to learn from researchers in the field and discuss emerging questions with other graduate students. I would bring a perspective grounded in econometrics, statistical decision theory, and information design, and hope to leave with more concrete ideas for contributing to this area.

Committee Members (Planned)

- Isaiah Andrews, Professor of Economics, MIT
- Alberto Abadie, Professor of Economics, MIT
- Nikhil Agarwal, Professor of Economics, MIT
- Ashesh Rambachan, Assistant Professor of Economics, MIT