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Fields of Concentration:
Primary Fields: microeconomic theory, game theory
Secondary Fields: industrial organization, financial economics

Desired Teaching:
Microeconomics, game theory, mathematical economics, financial economics

Comprehensive Examinations Completed:
2020 (Oral): microeconomic theory (*with distinction),* financial economics *(with distinction)*
2019 (Written): microeconomics and macroeconomics

Dissertation Title: *Essays on Microeconomic Theory*

Committee:
Professor Johannes Hörner (Co-Chair)
Professor Larry Samuelson (Co-Chair)
Professor Marina Halac

Degrees:
Ph.D., Economics, Yale University, 2025 (expected)
M.Phil., Economics, Yale University, 2020
M.A., Economics, Yale University, 2020
M.S., Economics, Toulouse School of Economics, 2018
M.S., Economics, University of Mannheim, 2018
B.S., Economics, University of Mannheim, 2016

Fellowships, Honors and Awards:
University Dissertation Fellowship, Yale University, 2024
Cowles Foundation & Economic Growth Center Fellowship, 2018–2023
Doctoral Fellowship, Yale University, 2018–2024
Deutschlandstipendium for outstanding students, University of Mannheim, 2017–2018

Teaching Experience:

Yale University

Fall 2023, Microeconomic Theory (Ph.D.), teaching assistant to Prof. Larry Samuelson
Summer 2022, Microeconomics (undergraduate), teaching assistant to Dr. Tolga Koker
Spring 2022, Microeconomic Theory (Ph.D.), teaching assistant to Prof. Philipp Strack
Fall 2021, Microeconomic Theory (Ph.D.), teaching assistant to Prof. Johannes Hörner
Summer 2021, Economics Math Camp (Ph.D.), teaching assistant to Dr. William Hawkins
Spring 2021, Microeconomic Theory (Ph.D.), teaching assistant to Prof. Johannes Hörner
Fall 2020, Microeconomic Theory (Ph.D.), teaching assistant to Prof. Johannes Hörner
Summer 2020, Economics Math Camp (Ph.D.), teaching assistant to Dr. William Hawkins

University of Mannheim

Spring 2017, Microeconomics (undergraduate), teaching assistant to Prof. Thomas Tröger

Research and Work Experience:

Research Assistant to Prof. Larry Samuelson, Yale University, Spring 2024
Research Assistant to Prof. Kai Hao Yang, Yale University, October 2021
Research Assistant to Prof. Joyee Deb, Yale University, January 2021
Research Assistant to Prof. Johannes Hörner, Yale University, Summer and Fall 2019
Research Assistant, ifo Institute Munich, Germany, Summer 2016

Working Papers:

"AI in Action: Algorithmic Learning with Strategic Consumers", (2024), Job Market Paper

"Mechanism Design with Costly Inspection", (2024), with Amirreza Ahmadzadeh, Revise & Resubmit at *Theoretical Economics*

"Repeated Games with Incomplete Information and Short-Run Players", (2022)

Work in Progress:

"Agent vs Algorithm: Repeated play against a Q-learning algorithm"

Seminar and Conference Presentations:

ESIF Economics and AI+ML Meeting 2024, Econometric Society European Winter Meeting 2023, Midwest Economic Theory Conference 2023, Toulouse School of Economics, Stony Brook Game Theory Festival 2022

Referee Service:

American Economic Review: Insights

Languages:

English (fluent), French (beginner), German (native), Spanish (beginner)

References:

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Dissertation Abstract

AI in Action: Algorithmic Learning with Strategic Consumers [Job Market Paper]

The increasing integration of artificial intelligence (AI) in business operations marks a significant shift in how companies interact with consumers. From content recommendations to fraud detection to dynamic pricing, firms use AI when dealing with consumers in various applications. I explore the effect of AI on firm-consumer relations, focusing on a core application of AI: learning algorithms.

Learning algorithms enable firms to detect patterns and adapt strategies based on predictive analytics. However, when a firm employs them in its interaction with consumers, learning must occur while consumers best-respond and therefore adapt their behavior. Little is known about how learning algorithms perform in such a strategic environment – as opposed to a stationary Markov environment – and consequently how their use impacts the interaction between firm and consumer.

In this paper, I examine this interaction between a learning algorithm and strategic consumers and assess its long-run outcomes in terms of profits, consumer welfare, and conduct. In my model, a firm using a reinforcement learning algorithm engages with a sequence of consumers. The algorithm takes as inputs the outcome of the interactions with past consumers and outputs an action. Consumers react optimally to anticipated firm actions. I place no restriction on the game between the firm and consumers. The model thus lends itself to applications as diverse as content recommendation, pricing, and effort provision.

A critical component is consumers' information about the algorithm. I assume consumers know the algorithm, but I distinguish two cases regarding their information about its inputs: transparent algorithms – when consumers have access to the algorithm's inputs – and opaque algorithms – when such information is not available to them.

The key findings are as follows. First, opaque algorithms perform better than transparent algorithms. In contrast to transparent algorithms, opaque algorithms learn the optimal policy even in this strategic environment. Consequently, opaque algorithms yield higher profits than transparent algorithms. When consumers have less information about the algorithm's inputs, they are more reactive to information about the algorithm's current behavior. This in turn enables the algorithm to learn to play the optimal action.

Second, consumer welfare can be higher when the algorithm is opaque than when it is transparent. I characterize a class of games in which consumers benefit from the algorithm learning the optimal policy and, thus, from having less information about the algorithm's inputs.

Third, I compare the firm's profits when using the algorithm with the profit it could achieve when being strategic and playing a repeated game with consumers. The comparison depends on the opaque–transparent dichotomy as well. If consumers observe past interactions, the firm achieves a higher profit when behaving strategically than a transparent algorithm does. The opposite is true when consumers do not observe past interactions: an opaque algorithm achieves higher profits than a strategic firm does. Taken together, my results suggest a novel rationale for opaque algorithms.

Mechanism Design with Costly Inspection, with Amirreza Ahmadzadeh, R&R at *Theoretical Economics*

This paper studies how to combine screening menus and inspection in mechanism design. A Principal procures a good from an Agent whose cost is his private information. The Principal has two instruments: screening menus – i.e., quantities and transfers – and (ex-ante) inspection. Inspection is costly but reveals the Agent's cost. The combination of inspection and screening menus mitigates inefficiencies: the optimal mechanism procures an efficient quantity from all Agents whose cost of production is sufficiently low, regardless of whether inspection has taken place. However, quantity distortions still necessarily occur in optimal regulation; the quantity procured from Agents with higher production costs is inefficiently low. A cost report triggers inspection only if the quantity procured from Agents at the reported cost is inefficiently low. In contrast to settings without inspection, incentive compatibility constraints never bind locally, but only globally. Nonetheless, the paper characterizes which incentive constraints bind.

Repeated Games with Incomplete Information and Short-Run Players

I analyze the value of persistent private information in repeated competitive interactions with short-lived players. To address this question, I study a repeated zero-sum game between a patient, long-lived player who is informed of the payoff functions and a sequence of short-lived, uninformed players. When monitoring of past actions is perfect, Aumann and Maschler's (1995) seminal "Cav u"-result obtains. The informed player loses her informational advantage when she utilizes her information, even when facing short-lived players; her equilibrium payoff is the same as when facing a long-lived competitor. When monitoring of past actions is imperfect, however, the payoff of the informed player can be strictly higher when facing a sequence of short-lived players instead of a patient long-lived player, depending on the payoff function and the monitoring structure. In this case, the informed player can leverage her private information without revealing it to the short-lived players. I provide a partial characterization of equilibrium payoffs when monitoring is imperfect.