MIT Economics

DANIEL CLARK

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DOCTORAL STUDIES

Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected completion June 2022
DISSERTATION: "Communication, Information, and Learning"

DISSERTATION COMMITTEE AND REFERENCES

Professor Drew Fudenberg
MIT Department of Economics
77 Massachusetts Avenue, E52-418
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Professor Alexander Wolitzky
MIT Department of Economics
77 Massachusetts Avenue, E52-518
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Professor Glenn Ellison
MIT Department of Economics
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PRIOR EDUCATION

Massachusetts Institute of Technology (MIT) 2016
S.B. in Mathematics

CITIZENSHIP USA

GENDER: Male

FIELDS

Primary Field: Theory

Secondary Fields: Industrial Organization, Organizational Economics

TEACHING EXPERIENCE

Microeconomic Theory III (graduate, MIT course 14.123) Teaching Assistant to Professor Drew Fudenberg	2021
Economic Applications of Game Theory (undergraduate, MIT course 14.12) Teaching Assistant to Professor Muhamet Yildiz	2020
Microeconomic Theory III (graduate, MIT course 14.123) Teaching Assistant to Professor Drew Fudenberg	2020
Game Theory (graduate, MIT course 14.126) Teaching Assistant to Professors Drew Fudenberg and Muhamet Yildiz	2020
Microeconomic Theory III (graduate, MIT course 14.123) Teaching Assistant to Professor Drew Fudenberg	2019
Game Theory (graduate, MIT course 14.126) Teaching Assistant to Professors Drew Fudenberg and Muhamet Yildiz	2019

RELEVANT POSITIONS

Research Assistant to Professor Drew Fudenberg	2017-21
Research Assistant to Professor Alexander Wolitzky	2019-20
Research Assistant to Professor Robert Gibbons	2018

FELLOWSHIPS, HONORS, AND AWARDS

MIT Economics Department Best Teaching Assistant	2021
MIT School of Humanities, Arts, and Social Sciences Levitan Teaching Award	2021
MIT Presidential Fellow	2016
Phi Beta Kappa	2016

PRESENTATIONS

ASSA Annual Meeting	2022
Econometric Society Summer School, Hokkaido University	2019
International Conference on Game Theory, Stony Brook University	2019
IO Theory Conference, UC Berkeley	2019

PUBLICATIONS

"Justified Communication Equilibrium" (with Drew Fudenberg), *American Economic Review* (111), 3004-3034, 2021

"Record Keeping and Cooperation in Large Societies" (with Drew Fudenberg and Alexander Wolitzky), *Review of Economic Studies* (88), 2179-2209, 2021

"Indirect Reciprocity with Simple Records" (with Drew Fudenberg and Alexander Wolitzky), *Proceedings of the National Academy of Sciences* (117),

11344-11349, 2020

WORKING PAPERS

"The Informed Principal with Agent Moral Hazard" (Job Market Paper)

http://economics.mit.edu/files/21921

We study principal-agent settings where the principal has private information, both the principal and agent have actions, and the agent's action is subject to moral hazard. Unlike past work focusing on explicit contracts, we allow the principal to propose contracts that give them flexibility in their choice of future actions. We develop an adaptation of sequential equilibrium called "contracting equilibrium" for our principal-agent games, and we prove its existence. In environments where the principal's type and agent's action are complements, we also apply a refinement called "payoff-plausibility." The "principal-optimal safe outcomes," which are analogs of the least-cost separating outcomes of signaling games, are always contracting equilibrium outcomes, and they provide an important payoff benchmark in that every principal type must obtain a weakly higher payoff from any payoff-plausible equilibrium. Moreover, if there are complementarities between the principal's type and their action, payoff-plausibility selects the principal-optimal safe outcomes when the principal is restricted to offering "deterministic" mechanisms. Otherwise, pooling between principal types can survive payoff-plausibility, and is more prevalent than would be predicted with explicit contracts.

"Robust Neologism Proofness"

http://economics.mit.edu/files/16758

We introduce robust neologism proofness, an equilibrium refinement that applies to both cheap-talk and costly signaling games. Robust neologism proofness eliminates equilibria that can be undone by a certain kind of credible communication from the sender to the receiver, formalized as a "credible robust neologism." We show that robust neologism proof equilibria exist both in a class of "monotonic" signaling games and any signaling game where the sender can give a transfer to the receiver. Additionally, we apply robust neologism proofness to various examples and compare it with other equilibrium refinements. Finally, we show that in the special class of "monotone-concave-supermodular" signaling games with transfers, robust neologism proofness selects the "sender-optimal" separating equilibria.

"Adverse Selection with Ex-Post Signals"

http://economics.mit.edu/files/16573

We study adverse selection problems in which the agent's type is two-dimensional and there is a contractible ex-post signal of one component of the agent's type. We analyze the extent to which the principal can use the ex-post signal to mitigate the effects of the asymmetric information concerning this component, and we characterize when the principal can completely eliminate such effects and achieve the same payoff as in the benchmark where this component is public information. Using this characterization, we show that, under broad conditions, the principal can never achieve the same payoff as the public information benchmark with any ex-post signal that has only two realizations. However, the principal can achieve this payoff with ex-post signals that satisfy a "positive curvature criterion." Throughout, we focus on the example of a firm employing an informed worker on a project, where the worker has superior information both about the difficulty of the project and the project's potential quality.

"Incentive Compatibility with Non-Convex Type Spaces"

http://economics.mit.edu/files/16577

We present results concerning the incentive compatibility of mechanisms when the agent's type space may not be convex. In particular, we provide a necessary condition for incentive compatibility when the agent's utility is convex in their type, a sufficient condition for incentive compatibility when the agent's utility is concave in their type, and a necessary and sufficient condition for incentive compatibility when the agent's utility is affine in their type. These results can be used to analyze screening problems that do not satisfy commonly imposed, but restrictive, assumptions such as the increasing differences condition, as we illustrate with examples.

RESEARCH IN PROGRESS

"Learning and Induction in Games" (with Drew Fudenberg and Kevin He)

We examine the relationship between the equilibria that emerge in steady-state learning models and the concepts of backward and forward induction. In two-stage games of perfect information, every equilibrium that arises from learning satisfies backward induction. With more than two stages, learning does not always require backward induction, but backward induction must be satisfied when later-moving players are relatively "experienced and patient." In games of imperfect information, strategies that are strictly dominated can be optimal experiments for agents to learn about the prevailing distributions of actions of other players. This can lead to equilibria that are eliminated by forward induction.

"Optimal Learning is Efficient Ex-Post" (with Drew Fudenberg)

We analyze the learning problem of a non-doctrinaire, Bayesian agent who chooses an action every period over an infinite time horizon and is uncertain about the underlying distributions of payoffs induced by their actions. Assuming that the agent at least observes their payoff every period, we show that, as the agent becomes perfectly patient, any optimal policy gives them an expected discounted payoff that uniformly converges to their expected payoff from their optimal action.