Yishu Zeng

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Fields

Microeconomic Theory, Information Economics, Game Theory

Education

09/2016–present   Ph.D., Economics, University of Michigan

08/2012–08/2016   Ph.D., Mathematics, National University of Singapore

09/2008–06/2012   B.S. (Honors), Mathematics, Sun Yat-Sen University

Dissertation

- Performance Evaluation Design in Dynamic Incentive Contracts, 2021 (**Job Market Paper**).

  Abstract: Consider a continuous-time principal-agent setting where the agent exerts effort to generate output and the principal evaluates and pays for the agent's performance. Can the principal benefit from committing to an evaluation scheme not directly based on the output? This paper gives an affirmative answer. In particular, the optimal evaluation scheme assigns inflated evaluations when the agent's continuation value is low and deflated evaluations when the continuation value is high. Adding such biases into evaluations allows the principal to recalibrate the agent's continuation value, which improves the contract by capturing gains from concavification that are not feasible in contracts directly based on output. As a result, biased evaluations also induce weakly higher volatility in the agent's continuation value even though the agent is risk-averse. Moreover, I show that additional contractual possibilities such as quitting the firm, promotion, and reciprocity in output, could strengthen leniency bias but weaken severity bias at the optimum. My results help explain evaluation biases that have been empirically observed in appraisal systems.

- Persuasion of Interacting Receivers, 2021 (presented in GAMES 2020 and Midwest economic theory conference)

  Abstract: Consider a setting where a sender could communicate privately with multiple receivers before they engage in a one-shot strategic interaction. To understand optimal information policy, standard approaches would focus on signals that recommend actions. However, if there are realistic features outside the scope of the standard model, such a focus could be suboptimal. This paper investigates situations that go beyond the standard model. In particular, we focus on the following features: (i) the equilibrium selection rule may be different from the sender-preferred one, (ii) receivers may have private information, and (iii) receivers may have non von Neumann–Morgenstern utilities. We establish a generalized obedience principle. In this version, the sender recommends actions, and *conjectures*. Under regularity conditions, we further show that it is without loss of generality to focus on *simple canonical signals*. The construction of the proof provides a tractable way to compute optimal signals in the aforementioned setting. We apply our result to study information policy design in two applications in which the equilibrium selections differ from the sender-preferred selection and receivers may be privately informed.

- Derandomized Persuasion Mechanisms, 2021 (under review)

Abstract: We consider a setting where one sender can communicate with several privately informed receivers through a persuasion mechanism before the receivers play a game. We show that for any potentially randomized persuasion mechanism, under certain conditions, there is an effectively equivalent derandomized persuasion mechanism, and these two mechanisms have the same set of equilibria. We exhibit the usefulness of our result in a specific disclosure problem, where we apply our result to derandomize optimal disclosure mechanisms. Overall, this paper provides a rationale for the fact that persuasion mechanisms are often deterministic in practice.

Publication

- Perfect and Proper Equilibria in Large Games (with Xiang Sun), *Games and Economic Behavior* 119 (2020), 288–308.

  Abstract: This paper studies pure strategy perfect and proper equilibria for games with non-atomic measure spaces of players and infinitely many actions. A richness condition (nowhere equivalence) on the measure space of players is shown to be both necessary and sufficient for the existence of such equilibria. The limit admissibility of perfect and proper equilibria is also proved.

Other working papers

- Characterizing Some Properties of Pure-Strategy Equilibrium in General Bayesian Games (with Wei He, Xiang Sun and Yeneng Sun), 2021.

  Abstract: This paper studies Bayesian games with general action spaces, correlated types and interdependent payoffs. We introduce the condition of "decomposable coarser payoff-relevant information", and show that this condition is both sufficient and necessary for the existence of pure-strategy equilibria and purification from behavioral strategies. As a consequence of our purification method, a new existence result on pure-strategy equilibria is also obtained for discontinuous Bayesian games. Illustrative applications of our results to oligopolistic competitions and all-pay auctions are provided.

- Stationary Markov Perfect Equilibria in Large Stochastic Games (with Wei He and Yeneng Sun), 2016.

  Abstract: This paper considers stochastic games with non-atomic measure spaces of players and general state spaces. We show stationary Markov perfect equilibria exist in behavioral strategies, and we also show that pure-strategy stationary Markov perfect equilibria exists in every large stochastic game if and only if the nowhere equivalence condition holds. To link with finite-agent stochastic games, the closed graph property for the correspondence of stationary Markov perfect equilibria is presented.

Work in Progress

- Competition in Costly Grading (with Uday Rajan), 2021.

  Abstract: This paper studies how competition affects information quality in a market of information intermediaries when there is a continuum of unknown types. Using the mean square error to measure the information quality, we find that when information is costly to produce, competition could worsen information quality. The driving force is that competing information intermediaries will generate very precise information for the top types, and when the information production cost is high enough, middle types may optimally choose to pool with low types. In the case when the low and middle types significantly outweigh the high types, the drawback of such a pooling at the bottom could succeed the benefit of the transparent information at the top, and the information quality is worsened overall. Our result overturns the known results that competition unambiguously improves information quality when information production cost is zero. We also illustrate the intuition with a parametrized example in which the information

quality generated by a monopolistic information intermediary is strictly higher than that under competing intermediaries.

- The Adaptive First-Order Approach to Principal-Agent Problems, 2020.

  Abstract: It is well-known that the first-order approach may fail in general, in view of which, the classical first-order approach literature develops various sufficient conditions on the primitives to justify this approach. However, those sufficient conditions are often regarded as restrictive. This paper explores a different way to apply the idea of the first-order approach to general Principal-Agent problems without imposing stringent conditions on primitives. Specifically, we propose what we call the adaptive first-order approach ("AFOA") that investigates the Principal-Agent problem among the set of contracts where the efforts that satisfy the Kuhn–Tucker conditions are indeed optimal for the Agent. We first provide a complete characterization of this set of contracts, building on which, we introduce a set of "validation" constraints. Then we reintroduce the Principal's problem by replacing the Agent's incentive compatibility constraint with the Kuhn–Tucker condition and the extra "validation" constraints. The reintroduced problem turns out to be a semi-infinite programming problem, to which we also provide a general treatment borrowing the insights from the semi-infinite programming literature and the polynomial optimization literature. By its design, AFOA could provide a lower bound estimation to Principal's optimal payoff in general Principal-Agent problems with relatively low computation cost.

Teaching Experience

- Fall 2020, Econ 601/603, Microeconomic Theory I & III (Ph.D.)
- Summer 2020, Microeconomic theory summer workshop (Ph.D., Role: independent instructor)
- Fall 2019, Econ 501, Microeconomic Theory (Master)
- Winter 2019, Econ 409, Game Theory (Undergraduate)
- Winter 2019, Econ 401, Intermediary Microeconomic Theory (Undergraduate)
- Fall 2017, Winter 2018, Fall 2018, Econ 101, Principle microeconomics (Undergraduate)

Awards & Honors

09/2021–12/2021	William Haber Graduate Fellowship, University of Michigan
07/2021	Rackham Travel Grant, University of Michigan
01/2021–04/2021	Economics Fellowship, University of Michigan
09/2016–08/2017	Ralph R. Lounsberry Memorial Fellowship, University of Michigan
08/2012–08/2016	Graduate Scholarship, National University of Singapore
06/2012	Outstanding Graduate Award, Sun Yat-Sen University
11/2011	Meritorious Winner, Mathematical Contest in Modeling
09/2008–08/2009	National Scholarship, Sun Yat-Sen University, China

Conference & Seminar Presentations

- Virtual Seminar in Information Economics and Experiments, Concordia University, Montréal, Oct 29, 2021.
- Microeconomic Theory Lunch Seminar, University of Michigan, Ann Arbor, Oct 19, 2021.
- Midwest Economic Theory Conference, Michigan State University, Lansing, Oct 8–10, 2021.

- The 6th World Congress of the Game Theory Society, Budapest, Hungary, July 19–23, 2021.

- Economic Theory Online Summer Seminar, University of Michigan, Ann Arbor, May 19 & 22, 2020.

- Microeconomic Theory Lunch Seminar, University of Michigan, Ann Arbor, Nov 19, 2019 & Apr 21, 2020 & Nov 10, 2020.

- The 15th SAET Conference on Current Trends in Economics, University of Cambridge, UK, July 27–31, 2015.

Citizenship and Visa status

Citizenship: China (F1 Visa)

References

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Service & Activities

- Student Coordinator for Microeconomic Theory Lunch Seminar, 09/2019–04/2021.

- Referee for Economic Theory Bulletin