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Research Statement

Philipp Strack

I am a microeconomic theorist who studies peoples behavior in dynamic situations. I am especially interested in the role of stochastically evolving private information. I studied the role of private learning in dynamic contests, strategic experimentation games, and dynamic mechanism design settings. The techniques used are drawn from game theory, optimization and probability theory. If necessary, I develop new techniques and mathematical results.

Applications of my work include revenue maximizing sale of airplane tickets, dynamic ad-word auctions, optimal unemployment benefits, model-free option pricing and competition between mutuals fund managers.

Research

The first strand of my research deals with dynamic mechanism design (“Dynamic Implementability for Optimal Stopping”, “Efficient Dynamic Allocation with Strategic Arrivals”, “Dynamic Revenue Maximization: A Continuous Time Approach”). In a dynamic mechanism design problem the agents possess private information that changes over time. The designer wants to elicit this information to implement an optimal allocation. The main difference to my research in game theory is that the designer can commit to a strategy and monetary transfers are allowed. In the context of revenue maximization for durable and non-durable goods, we study how a designer could optimally learn from agents who strategically try to manipulate his belief. Examples of such situations are the revenue maximizing sale of airline tickets or repeated Ad-Word auctions. My Job Market paper deals with the more general question of characterizing the set of implementable dynamic policies if the relevant information is not directly observable but controlled by strategic agents in the context of optimal stopping. Applications of the model include the design of unemployment benefits and the regulation of market entry.

The second line of my research analyzes winner-takes-all contests, where the progress of the contestants evolves over time (“Gambling in Contests”, “Continuous Time Contests”, “Equivalence of Stochastic Contests with Poisson Arrivals and All-Pay Auctions”). Contestants observe their own progress, but not the progress of their rivals. This is a stylized model of competition with changing private information. By introducing dynamic private information we can make new predictions about risk-taking behavior in contests. Our model predicts for example that competition between

mutual-fund managers will lead to excessive risk taking.

The research on strategic experimentation with private payoffs analyzes a situation where two agents privately observe a stochastic process (“Strategic Experimentation with Private Payoffs”). Contrary to the above contest situation the agents' payoffs are now assumed to be independent and interaction is purely informational. Each agent can engage in costly experiments to generate information that is valuable for future decisions. As agents can observe each others behavior, however, they may choose not to pay the cost of experimentation but to imitate the other agent. We provide conditions under which one can overcome this free-riding incentive using cheap-talk communication even absent monetary transfers.

My work on dynamic prospect theory analyzes the behavior of a naïve prospect-theory agent who faces the task of stopping a stochastic payoff process (“Until the Bitter End: On Prospect Theory in the Dynamic Context”). We show for a wide range of settings that the naïve prospect-theory agent will never stop. This prediction has strong implications; for example, a naïve prospect-theory agent will gamble in a casino until he is bankrupt. It also questions whether prospect theory can explain the disposition effect discussed in the finance literature.

My research in probability theory evolves around questions that arise from my economic research (“Skorokhod Embeddings in Bounded Time”, “Skorokhod Embeddings for Diffusions”). The work on bounded time Skorokhod embeddings is motivated by the fact that the embedding is the key technique in the equilibrium construction in dynamic contests. Furthermore, the Skorokhod embedding is used to price options in finance.

Future Plans

Looking forward, I plan to continue my work on dynamic mechanism design to develop a better understanding of the constraints imposed by the presence of private information and how they can be integrated into dynamic optimization problems, such as Dynamic Revenue Maximization. Moreover, I intend to investigate the theoretical predictions for dynamic behavior made by other behavioral theories such as regret or reference-dependent preferences.