

Research Statement

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I am a microeconomic theorist with interests in both pure and applied economic theory. My research agenda in pure theory stems from my PhD thesis and establishes the importance of belief-dependent solution concepts in robust mechanism design. After joining UCLA, I embarked on various projects applying economic theory to industrial organization, labor economics, and information economics.

Robust Mechanism Design

One strand of my research contributes to mechanism design, a sub-field of economic theory that studies how to allocate resources when optimal allocations depend on information which is dispersed in the population. For concreteness, consider the government's problem of auctioning spectrum licenses to mobile network operators. To determine which allocation is socially desirable, the government needs to know operators' cost and demand estimates, which are proprietary information. One aim of an auction is to incorporate such information into the allocation via the operators' bidding behavior; but doing so is difficult when operators bid strategically. An auction is deemed robust if it performs well for a broad class of assumptions about bidders' attributes. One attribute that is critical for bidding behavior in many auctions are bidders' beliefs over each other's information. The standard, belief-free, approach to address the seller's uncertainty about such beliefs is to focus on the (few) auctions where bidding behavior is independent of beliefs. There are two settings in which this approach works well – in the sense that an ascending price auction is belief-free. 1) Private values: bidders know their valuations for all allocations and do not care to learn others' information, e.g. others' demand estimates; 2) one-dimensional types: every bidder's information is summarized by a single number, e.g. when a single object is being auctioned. "The Limits of Ex-Post Implementation" (with Jehiel, Moldovanu, and Zame) highlights the limits of the belief-free approach by showing that in almost all settings of practical interest, where values are not private and types are multi-dimensional, belief-free auctions simply do not exist. This severely limits the attractiveness of the belief-free approach and directs attention to more permissive solution concepts that allow bidders' behavior to depend on their beliefs. This paper was published as lead article in *Econometrica*, one of the "top five" journals in economics.

A sequence of follow-up papers proposes and analyzes these more permissive, belief-dependent solution concepts. "Posterior Implementation vs. Ex-post Implementation" (*Economic Theory*; with Jehiel, Moldovanu and Zame) gives an example where posterior implementation leads to

more permissive results; this concept requires an agent's actions to be optimal conditional on the information inferred from others' actions. "Locally Robust Mechanism Design and its Limits" (*Journal of Economic Theory*; with Jehiel and Moldovanu) maintains the belief-free assumption but assumes that the seller has some knowledge of bidders' beliefs. We show that locally robust implementation is more permissible than ex-post implementation, but it is still subject to a similar impossibility result. Finally, "The Robustness of Robust Implementation" (*Journal of Economic Theory*; with Morris) allows for general, belief-dependent behavior and identifies settings in which close-to efficient allocations are robustly implementable.

Applied Theory

Reputation: "Reputation for Quality" (*Econometrica*; with Board) considers a firm that can invest or disinvest into the quality of its product and whose revenue depends on its reputation. Traditionally, reputation is modeled as the market's belief about some inherent attribute of the firm, such as its engineering ethics. Our model uses product quality as the firm's type. In contrast to the literature, we allow the firm to invest into its type and thereby its reputation. In equilibrium, investment incentives are determined by the present value of future reputational dividends. We investigate these incentives under different scenarios regarding the manner in which the market learns about the firm's type. If learning is via good news events, such as successful product trials in the bio-tech industry, low-reputation firms invest while high-reputation firms rest on their laurels; thus, reputational dynamics are cyclical. If learning is via bad news events, such as exploding batteries in the computer industry, low-reputation firms give up while high-reputation firms invest to protect their reputation; thus, reputational dynamics diverge. "A Reputational Theory of Firm Dynamics" (with Board) embeds this new model of reputation into a firm life-cycle theory where firms exit when their products fail to succeed. We find that investment behavior is single-peaked: a firm shirks immediately following a breakthrough, works for intermediate levels of reputation, and shirks again when it is about to exit. By differentiating a firm's quality from its reputation, a distinction that is absent in standard firm life-cycle models, our model offers a natural lens through which to analyze the vast amounts of reputation data generated by review sites such as Yelp, J.D. Power or Facebook.

Competitive Contracting: There is an extensive empirical literature studying the joint distribution of residual productivity and wages, i.e., the components of firms' productivities and workers' wages that cannot be explained by observable characteristics. This literature has documented significant dispersion and a strong correlation between productivity and wages. "Relational Contracts in Competitive Labor Markets" (with Board) shows how such dispersion arises naturally among ex-ante identical firms and workers in a model in which firms motivate their workers via the promise of future wages, and employed workers compete with the unemployed for vacancies. As a methodological innovation, this paper introduces a flexible way to compare the competitiveness of employed and unemployed workers when applying for vacancies. This paper was recently accepted for publication in the *Review of Economic Studies*,

another one of the “top five” journals in economics. “Competitive Insurance Markets with Limited Commitment” (with Board) applies the competitive contracting framework to an insurance market where policy holders can walk away from their contracts at any time, while insurers can commit to their policies in the short term but not in the long term.

Information Aggregation: “A Conversational War of Attrition” (with Bognar and Smith) introduces a simple model of costly dynamic deliberation. Two differentially biased and partially informed jurors sequentially argue to convict or acquit a defendant of a crime; a verdict requires that both jurors argue for it in succession. The equilibria of our model shed light on a common typology of debating styles. For instance, when the jurors’ bias is small, the only stable equilibrium sees each juror parsing his information finely and playing the devil’s advocate, arguing his cause past the time when his posterior belief favors conceding. On the other hand, when the jurors’ bias is large, “shouting matches” arise where each juror guards his turf and only ends the argument by quitting despite his druthers. There are also equilibria where at some point one juror digs in his heels, forcing the other to defer; such equilibria represent an inefficient break-down of communication and require that jurors interpret deviations from the equilibrium path as mistakes.

“An Optimal Voting System when Voting is Costly” (with Bognar and Börgers) contributes to the recent literature on dynamic mechanism design. It shows that such a voting system combines two elements: (i) there is an arbitrarily chosen default decision and non-participation is interpreted as a vote in favor of the default; (ii) voting is sequential and is terminated when a supermajority requirement is met. This paper is conditionally accepted at the *Journal of Economic Theory*.