

Stochastic Choice and Noisy Beliefs in Games*

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Abstract

We study the primitive mappings that underlie most solution concepts for games: (i) the mapping from beliefs over opponents' behavior to a distribution over actions and (ii) the mapping from opponents' behavior to a distribution over beliefs. In our laboratory experiment, we collect actions data and elicit beliefs for a family of asymmetric 2-player games with systematically varied payoffs, allowing us to “trace out” these mappings. We organize our results around testing the behavioral axioms of quantal response equilibrium (QRE) and noisy belief equilibrium (NBE), models that generalize Nash equilibrium by injecting “noise” into actions and beliefs, respectively. We find that, while both sources of noise are important in explaining observed behaviors, there are systematic violations in both sets of axioms. The data (actions and beliefs jointly) are well described by a modified version of cognitive hierarchy plus risk aversion. Structural estimates suggest that the player role itself induces a higher degree of strategic sophistication in the player with more asymmetric payoffs.

Keywords: beliefs; quantal response equilibrium; noisy belief equilibrium

JEL Classification: C72, C92, D84

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