

Aggregate dynamics in a Bayesian game: status-quo bias and non-aggregability

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Abstract

We consider a binary Bayesian game with large population where agents have additively separative payoff heterogeneity, and we investigate dynamic relationship between the aggregate strategy (the action distribution aggregated over all agents) and the strategy composition (the joint distribution of action and payoff type). When each agent's decision follows the best response dynamic with constant revision rate, Ely and Sandholm (2005) prove that the dynamic of aggregate strategy is independent from the strategy composition. Here we prove that, if each agent faces i.i.d. status-quo bias, the strategy composition affects the aggregate dynamic; in particular, the aggregate dynamic is perturbed by discrepancy from equilibrium composition. So the stochastic status-quo bias works as nonaggregate perturbation to the aggregate dynamic, without adding extra heterogeneity on agents' learning. We further investigate the implication on optimal control for the benevolent social planner.

Keywords: tempered best response dynamic, Bayesian games, aggregate dynamics, bang-bang control, learning speed, payoff heterogeneity

JEL classification: C73, C62, C61

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