Title: **Measuring the Dynamic Efficiency Costs of Common-Pool Resource Exploitation**

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Abstract: This paper conducts the first empirical investigation of common-pool resource users' dynamic and strategic behavior at the micro level. We examine fishermen's strategies in a fully dynamic game that accounts for latent resource dynamics and other players' actions and recover the profit structure of the fishery. The ability to measure efficiency losses from common-pool resource exploitation hinges not only on data availability but also on recent methodological developments in dynamic discrete choice modeling. For estimating the choice model, we use a two-stage estimator. In the first stage, we estimate the evolution of the state variables, namely, factors influencing players' decisions. These factors are reflected in choice probabilities conditional on those state variables. In the second stage, since there are many agents, we use a simulation-based conditional choice probability estimator to evaluate a choice-specific value function for each individual. Then we apply the pseudo maximum likelihood (PML) estimator to solve for the structural parameters. We apply the model to microdata on the North Carolina shrimp fishery. To quantify the dynamic efficiency costs, we compare the fishermen's actual and socially optimal exploitation paths under a time-specific limited entry system. We find a sizable dynamic externality in which individual fishermen respond to other users by exerting effort above the optimal level. Congestion is costly in the short run but is beneficial in the long run because it offsets some of this dynamic externality.