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New Approaches to Multistage Equilibrium Problems in Economics

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In this study, we examine multistage problems involving multiple agents, commonly known as stochastic dynamic games. Solving such problems is particularly challenging in real-world scenarios with a large number of interacting agents. We present a general formulation and focus on an incomplete market, heterogeneous agent model with aggregate uncertainty—the Krusell-Smith model. Our numerical exploration begins by reviewing traditional strategies for deriving equilibrium solutions, starting with the moment approach originally proposed by Krusell and Smith (1998). We then introduce a novel method that departs from the assumption of a predefined functional form for agents' capital dynamics. Instead, our approach iteratively constructs a Markov Chain based on the states visited, offering greater flexibility in capturing equilibrium dynamics. Finally, we discuss how these techniques can be extended to heterogeneous agent New Keynesian (HANK) models. These models have become an essential framework for central banks, enabling them to analyze the distributional effects of monetary policy and better understand the link between macroeconomic fluctuations and inequality.

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