

Project Summary

Michael Miller

Stanford University

Mentor: Doyne Farmer, McKinsey Research Professor, Santa Fe Institute

Many everyday interactions involve a mix of logic and chance, yet most simple game theoretical or economic models employ either logic or chance exclusively. We will take a simple model, starting with a coin flip, where the players' bets influence the outcome in a straightforward fashion. The coin may work for or against the players. The existing models which Doyne Farmer and two coauthors have explored contains quite simple dynamics. If players follow fixed strategies, one player ends up with all the wealth in the system, regardless of the bias of the coin. We plan to employ a number of extensions in search of more complex behavior. For example, adding a small redistributive tax eliminates equilibrium with a single wealthy player, replacing it with an unstable exponential distribution. We will explore adaptive strategies, players with disproportionate influence ("pundits"), the effect of limited lifetimes and inheritance, and other variations. Through numerical simulation and analytic exploration, we hope to be able to generalize beyond our simplistic game. The study may reveal insights into everything from rigged betting to simple stock markets.