

Cognitive Capacities and Trading Behavior in Experimental Asset Markets

Andreas Hefti (UZH)

Steve Heinke (UZH)

Frédéric Schneider (UZH)

When they face complex, strategic decisions, actual humans frequently diverge from the prediction of (Nash) equilibrium theory. In this project, we propose that such *behavioral* patterns in games can be understood as the result of systematic differences in the way individuals think, i.e., in their cognitive model of the choice situation at hand. Specifically, we conjecture that heterogeneous behavior can be conceptualized as the product of two fundamentally different cognitive capacities: *Analytical capacities (A-dimension)* and *cognitive empathic capacities (CE-dimension)*.

Analytical capacities refer to the ability of individuals to handle the logical or quantitative aspects of a decision problem, to master quantitative or probabilistic calculations, and to consistently apply logical reasoning or algorithmic solution concepts as presumed by game-theoretic equilibrium behavior (such as backward induction). *Cognitive empathic capacities* refer to intuiting about opponent's behavior in games, by putting oneself in "other people's shoes".

In this study, we concentrate on applying our notion of cognitive representations to a complex, strategic environment: Experimental Dynamic Asset Markets. Surprisingly, in these laboratory settings, price bubbles arise despite i) a much simpler dividend process than in the real world, and ii) the fact that all participants have access to the same information. Applying our conceptual framework to the asset market, differences in cognitive capacities translate into heterogeneity in expectation formation and thus different trading patterns. Our framework yields many precise and testable predictions about individual trading patterns and the resulting aggregate price dynamics.

We test these predictions in a baseline design, where we first independently measure subjects' cognitive disposition in a screening phase. We then observe their trading behavior in laboratory asset markets. In further treatments, we vary the group composition for the asset market, by selecting the subjects along each cognitive dimension. Our experimental evidence strongly suggests that our two-dimensional capacity measure is both necessary and sufficient to explain the observed individual trading patterns, and the resulting emergence of aggregate asset market bubbles.