Uncertainty Aversion in Complex Markets

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Motivation:
Main motivation for this project is the examination of the implications of heterogeneous agents in finance, especially in the cases when uncertainty arises. Recent development in behavioural decision making, combined with the ever increasing availability of high-frequency data, offers a great opportunities for a deeper understanding of the price-setting procedure as well as the phenomenon of investors' herding. Given that behavioural biases are mostly projected on the individual level of decision making, there is a strong need for research combining behavioural economics and market micro-structure literature.

Objectives:
Construction of a model that takes advantage of the recent literature in the field. This model should offer insight and intuition on the price determination mechanism in such a heterogeneous environment, where agents face uncertainty and/or behavioural biases.

Methodology:
Key methods required for this project should already be known to any Complexity Science student. Some illustrative examples of the required capabilities can include the following:
Agent-based Modelling
Numeric Integration of ODEs
Stochastic Simulation (C/C++)
Statistical Inference

Deliverables and Impact:
The main outcomes of the mini-project will be of theoretical nature. Examination and evaluation of past models is necessary. Building on this, optimizing or further extending one of the examined models is the next logical step. Expected outcomes would be a comparison between the impact of uncertainty aversion on price discovery processes in micro and in macro (aggregated) level.

Further Directions:
A PhD project can be the natural continuation of any of the broad directions examined during the course of the mini-project, especially in the aspects concerning the area of heterogeneous agents in complex markets and the decision procedures under states of market uncertainty.

Preliminary Reading:
Kozhan R., Salmon M., 2009 Uncertainty aversion in a heterogeneous agent model of foreign exchange rate formation. Journal of Economic Dynamics & Control (33) 1106–1122
Boswijk,H., Hommes,C., Manzan,S., 2007. Behavioural heterogeneity in stock prices. Journal of Economic Dynamics & Control 31(6),1938–1970.
De Grauwe,P., Grimaldi,M., 2006. The Exchange Rate in a Behavioural Finance Framework. Princeton University Press, Princeton.