How do skilled traders change the structure of the market

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Extended Abstract

An important feature of heterogeneous agents models (HAM) is their ability to explain stylized facts observed in financial time series, mainly fat tails and volatility clustering. Typically, in the heterogeneous agents model, two types of agents are distinguished: fundamentalists and chartists. Fundamentalists base their expectations about future asset prices and their trading strategies on market fundamentals and economic factors, such as dividends, earnings, macroeconomic growth, and unemployment rates. Chartists (or technical analysts) try to extrapolate observed price patterns, such as trends, and exploit these patterns in their investment decisions.

Our model presents a form of evolutionary dynamics called the Adaptive Belief System in a simple present discounted value (PDV) pricing model. The first part of this model was elaborated by Brock and Hommes in 1998[1], the second part is our extension of the original model. Simulated capital market is a system of interacting agents who immediately process new information. Agents adapt their predictions by choosing from a limited number of beliefs (predictors or trading strategies). Each belief is evaluated by a performance measure. Agents on the capital market use this performance measure to make a rational choice

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[1]Brock, W. A., Hommes, C. H. (1998) Heterogeneous Beliefs and Routes to Chaos in a Simple Asset Pricing Model. Journal of Economic Dynamics and Control 22:1235-1274

which depends on the heterogeneity in agent information.

In this paper we introduce a new concept - skilled traders with memory. The idea of skilled traders is based on the endeavor of market agents to estimate future price movements. By adding skilled traders with memory we try to improve the original heterogeneous agents model so it can better approximate real markets. These agents are designed to forecast the future trend and bias parameters of price deviations using an information set consisting of past deviations.

We start the simulations with a model, where all traders have stochastically generated parameters. Successively, we introduce the skilled traders into the market and study the change of the market structure with growing number of skilled traders. Skilled trader differs from the stochastically generated one with ability to forecast future price movements. In the simulations, the proportion of skilled traders in the model grows from zero to one, meaning that finally, we have the market where only skilled traders are present. This setting generates very interesting results. Volatility of the simulated market returns measured by standard deviation growths rapidly with growing number of skilled traders in the market, while excess kurtosis is decreasing. Stock market returns also seem to have heavier tails. Very interesting is also to study the persistence of the simulated market. The more skilled traders are in the market, the more persistent the market is. As the persistence measure, we use Generalized Hurst exponent, which has reasonable finite sample confidence intervals allowing us to statistically compare different stock markets.