
Computational Finance

Market-Making: From Algorithms for Price-Setting to Emergent Market Properties

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With the dramatic increase in electronic exchanges and automated trading in recent years, it has become important to develop new computational and algorithmic tools for analyzing market properties and designing software agents that participate in market activities. Most modern exchanges, ranging from major equity markets like the NYSE and NASDAQ to electronic betting and prediction markets like tradesports.com, employ or designate market-makers, agents with special responsibilities for maintaining liquidity and orderly price transitions. Market-makers are obligated to continuously post and honor two-sided (buying and selling) prices.

The problem of deciding what prices to set is similar to the auctioneer's pricing problem in a two-sided version of the online posted-price mechanism that has recently received considerable attention in theoretical computer science. In this talk I will present a Bayesian algorithm that can be used by a market-making agent to continuously post prices and update its beliefs based on the sequence characterization of the market-maker's exploration-exploitation dilemma as a tradeoff between price discovery and profit-taking. It also allows us to build richer agent-based models of markets that can be useful both in understanding properties of existing markets and in predicting the impacts of structural changes. For example, I will show how the presence of a market-maker leads to rapid price discovery following a jump in the true value of an asset, and how this effect is more pronounced when market-makers compete than when they are monopolists.

This talk will not assume any prior knowledge of finance or economics.