

Information Efficiency and Liquidity in Information Markets

A market maker based approach

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Biographical statements

Stephan Stathel is a PhD student and research assistant at FZI Research Center for Information Technology, Karlsruhe. As a member of the research project Theseus his research focuses on market engineering in general and how to use information markets in different domains, especially in service innovation.

Stefan Luckner is a postdoctoral researcher at the Karlsruhe Service Research Institute (KSRI), Karlsruhe University. He holds a PhD from Karlsruhe University. His research demonstrates that markets are accurate predictors. Moreover, his findings on traders' biases and incentive schemes are valuable for designing future information markets.

Clemens van Dinther is a postdoctoral researcher at FZI Research Center for Information Technology, Karlsruhe, leading a research group of five researchers mainly interested in service and information science, market engineering and logistics.

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Business challenges related to new service development require information which is dispersed among many people. However, these people cannot be easily identified in most cases. Yet, more and more companies recognize the potential of collective intelligence and try to leverage the *wisdom of crowds* through technologies such as wikis and blogs. All of these technologies help to aggregate information by collecting and structuring knowledge of as many people as possible.

At the same time, interest in information markets – which are also based on collective intelligence – has continuously increased in the scientific world and industry. Information markets are used to aggregate traders' information and expectations. Typically, traders have different private information which might be distributed asymmetrically. Hayek's market's price mechanism is an efficient way to aggregate asymmetric information. Traders buy and sell contracts in information markets and prices fully reflect their information if these markets are informational efficient. Prior research provides evidence that information markets indeed perform very well for predicting e.g. the outcome of political elections, sports events, as well as box office revenues, which are of a broad public interest. But information markets applied in domains of little public interest may be illiquid while only a few traders are participating. Even in security exchanges, stocks above a certain order size usually cannot be traded immediately based on current supply and demand conditions. Information markets therefore may end up with results which are difficultly interpretable.

The challenge in domains of little public interest is to overcome market illiquidity as well as keeping virtual information markets informational efficient. Therefore we introduce an automated market maker in this paper. Our research statement is: An automated market maker is capable of increasing market liquidity and hence, leads to better information market results. Compared to financial markets, information markets are relatively thin in most cases. Consequently, traders may lose interest and new information will not be immediately reflected in stock prices. On the one hand, our proposed market maker provides permanent liquidity by offering market liquidity based bid and ask quotes in order to maintain reasonable share prices. By learning the fundamental value from trading activity in the market, the market maker derives its own order volumes and prices after each transaction in the market. On the other hand, the market maker keeps track of the overall stock price sum. In information markets, the sum of all shares' prices, reflecting a fraction for each event, must sum up to 1 because only one event in the real world is being predicted. Otherwise, arbitrage trading possibilities indicate market's informational inefficiency. While our automated market maker is a competitive market maker performing liquidity and arbitrary operations, it is handling own capital and own inventory. Skimming money out of the market is intended in no case. Therefore, arbitrary benefits will be used to provide tight spreads for liquidity issues.

In June, the European Soccer Championships are held in Austria and Switzerland and during that event, we will provide an CDA information market¹ in order collect opinions from traders interested in soccer games which team is going to win the tournament. Thus, we invited only a few traders to investigate the effect of automated market making by dividing the crowd into 2 separate markets – with and without market maker. We expect first results by the end of June. In summary, our automated market maker will provide information market liquidity and efficiency by attracting traders to stick to the market causing higher trading activity and thus, leading to better market results.

¹ <http://octopus28.fzi.de/predictionmarket/>

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