Matching Mechanism Differences Between Classical and Financial Markets

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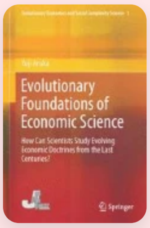

Evolutionary Foundations of Economic Science

Yuji Aruka

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Abstract

The world currently faces a global financial crisis following massive breakdown of the financial sector, at least in part because of deregulation. But what does this mean for economics? We explained in Chap. 1 that the modern financial market differs in many ways from the classical economic idea of a market. A modern financial exchange is a system of heterogeneous interactions, all with different strategies. The participants may no longer be regarded as a homogeneous agent, subject only to the common rationality principle. Traders' strategies are confined by regulations setting out the complicated rules and customs for auctions. A

simultaneous move of ask and bid may be allowed. A strategy employing the market order without specifying the limit order may also be allowed. The market could accept any type of order, whether intelligent or non-intelligent. Non-intelligent agents may even be winners. Behavioral considerations, based on game theory, may be unhelpful or even useless in the market as it truly exists. Actual transaction customs are based not only on institutions but also computer servers. We therefore also need to examine the design of AI-based servers as well as transaction algorithms. This may lead us to re-examine the features of the free market, and in particular the financial one. Over recent years, we have been able to successfully examine a set of features of the market system by developing an AI simulator for the futures stock market, which is called U-Mart. In the light of this work, we will discuss an essential structure for the coordination of supply and demand in the free financial market system.

This chapter is an extended version of one presented to the Joint Conference of 2008 Winter Workshop on Economics with Heterogeneous Interacting Agents and The 7th International Conference on Computational Intelligence in Economics and Finance, Taoyuan, Taiwan, Dec 5–7, 2008, titled "Futures stock market pricing by the use of the U-Mart system as an artificial intelligent market simulator." Sects. 4.1.1–4.1.1.1 first appeared in Aruka and Koyama (2011)

Notes

1. U-Mart started in 1998 as V-Mart (Virtual Mart), but is now called Unreal Market as an artificial research test bed. The U-Mart Project has just published an English textbook (Shiozawa et al. 2008) as one of the Springer Series on Agent-Based Social Systems. The development of the U-Mart system was mainly engineer-driven (http://www.u-mart.org/html/index.html), and is now internationally recognized as a good platform for AI markets. The project has had a policy of publicizing all program sources. Many other reports of AI market simulations provide no information about how to operate the AI. We believe that the results of market simulations by secret sources may be almost worthless.

2. See http://www.tse.or.jp/english/faq/list/stockprice/p_c.html.

3. There are various kinds and qualities of rice, so there were also many types of rice stamps.

4. **The U-Mart Project** publicizes the fundamental default strategies on the site: http://www.u-mart.org/html/contentsE/sampleagentE.html. The copyrights of default strategies belong to (c)2000 Rikiya FUKUMOTO (c)2002 U-Mart Project.

5. In the following, the first capital letter “S” means “spot prices”.

6. Given a single market, this may be simultaneous ask and bid.

7. See Fisher (1930, 1974).

8. This part depends on Kita (2012). Prof. Hajime Kita, Kyoto University, has recognized this fact and arranged well the U-Mart Project of a simple shaped market at the beginning of this project. The description of this subsection depends on his discussion.

9. Our spot time series is adapted from ‘2009-5-25_2010-1-6.csv’ in www.src/nativeConfig in the **U-Mart ver. 4** system.

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