Marginal Contribution of Information to Profit in a Zero-sum Game

Hiroyasu Yoneda* Gen Masumoto† Sobei H.Oda‡

This paper describes how those who are less informed play a zero sum game with those who are better informed. Apparently more informed players can always earn more than a less informed players. In the real world, in the stock and future markets in particular, however, modestly-informed traders seem to miss their guess more frequently than no-informed or random traders do. In this paper we shall show why and how such paradoxical phenomenon can be observed with mathematical analysis, computer simulations and experiments with human subjects.

In the next section we shall show the model of a future market presented by Huber and Kirchler (2004) at 9th Workshop on Economics and Heterogeneous Interacting Agents.

In Section 4 we shall show the results of simulations. The paradoxical income distribution can be realised by the following mechanism: fully-informed traders, who can correctly see the true values of commodities, can earn profits in future markets; no-informed traders, who cannot access any information about the values, buy or sell commodities arbitrarily so that they can expect zero profit in the long run; partly-informed traders can be misled by biased information so that they suffer from losses. We shall also see that less-informed players may increase their profits if they change their strategies according to the strategy of their more informed rivals.

In Section 5 we shall explain our experiments with human subjects and computer agents. The results show that human subjects successfully change their strategies if their competitors (more informed computer agents) change their strategies.

In Section 6 we shall mention game theoretical analysis. The analysis of the three-person game, which is the minimum example of our model, suggests that cooperation among less informed players can decrease their losses, though it can be lost by individual profit-maximising behaviour.

In the last section we conclude our analysis with some remarks.

*Graduate Student, Division of Economics, Graduate School, Kyoto Sangyo University, <g907888@cc.kyoto-su.ac.jp>

†Postdoctoral Fellow, Division of Economics, Graduate School, Kyoto Sangyo University, <gen@cc.kyoto-su.ac.jp>

‡Professor, Faculty of Economics, Kyoto Sangyo University, <oda@cc.kyoto-su.ac.jp>