

Referee Report on  
Efficiency and stability in complex financial markets  
MS# 401 for Economics

Comments

1. I interpret differently than do the authors the findings of Berg et al regarding information aggregation into the market price. Knowledge of the raw signals reveal nothing about the market, and thus this model does not offer the opportunity for Hellwig (1980) type information aggregation.

The mechanism by which  $p^o$  is able to reflect  $R^o$  is through the trader's adjustment of the quantity demanded,  $z_i^m$ , according to the accuracy of their personal signals. Each period, each trader receives a state-dependent signal, either +1 or -1 (that was initially randomly assigned) but without knowing the state that generated the signal. The trader maps the signal to a demand,  $z_i^+$  for the plus signal and  $z_i^-$  for the minus signal, updating the values based on experience. Those traders for whom  $\text{corr}(R^o - p^o, z_i^m)$  is towards  $\pm 1$  can take strong positions based on their signal, those with a near zero correlation will take weaker positions. Since  $p^o$  is endogenous to the positions taken by the traders, there is a feedback between beliefs and the market. The finding of Berg et al is that as  $N$  increases, so does price accuracy. The process is not so much about information aggregation but the emergence of enough traders so that the signal combinations span the state space.

2. At full market efficiency,  $R^o - p^o = 0$  and intuitively, one might wish to see  $z_i^m = \Phi(U_i^m) \rightarrow 0$  so that there is no trade. Instead  $\Phi(x) \rightarrow 0$  for  $x \rightarrow -\infty$  implying  $\Phi(0) > 0$ .
3. One would expect that the signal of the chartist to be orthogonal to the payoff so that in an efficient market  $U_0^m \rightarrow 0$  and I suspect in an inefficient market,  $U_0^m < 0$ , but as long as  $-\infty < U_0^m$ ,  $\Phi(U_0^m) > 0$  the chartist still takes a position in the market. This aspect of the market should be discussed and developed.
  - a. As  $R^o - p^o \rightarrow 0$ , does the behavior of the chartist differ from that of a "fundamental" trader whose signals also happen to be orthogonal to  $R^o - p^o$ .
  - b. I am not sure that I am comfortable drawing the conclusion that convergence towards market efficiency invites chartism when, by design,  $\Phi(0) \neq 0$ , forcing the chartist to trade in an efficient market.
  - c. As  $R^o - p^o \rightarrow 0$ ,  $U_i^m \rightarrow -\Gamma_\epsilon$  so that for a given price differential, the informed traders take a smaller position as costs rise. I suspect that in order to absorb the demand of the chartist, the price deviation from efficiency has to be more extreme. Still, this is only relative to  $\Gamma_\epsilon = 0$  where you will still get the same basic behavior, so it is unclear to me that including a cost is required for the model.

Hellwig, M.F., 1980. On the aggregation of information in competitive markets. *Journal of Economic Theory* 22, 477-498.