Reply to Referee-Report on "Efficiency and stability in complex financial markets"

February 8, 2010

We thank the Referee for his/her overall positive assessment of our paper "Efficiency and stability in complex financial markets". As the referee says, in the simple model of the market we consider, the introduction of non-informed traders seems to have a stabilising effect on the informed ones. This can be highlighted by looking at the behaviour of the susceptibility of informed traders, that quantifies their response to small changes in the constitutive parameters of the model.
As shown in Figure 1, the susceptibility as a function of n is characterised by a peak when the market comes close to efficiency. As n increases further, however, the susceptibility decreases to zero.

The information cost ϵ plays a nontrivial role, however, as evidenced by the behaviour of the susceptibility as the information cost ϵ is decreased (Fig. 1). In this situation the peak in the susceptibility becomes more pronounced. When information costs vanish ($\epsilon \to 0$) the susceptibility diverges in the whole efficient phase, i.e. for n large enough ($n \geq n_c$), see Figure 2. When there are no information costs ($\epsilon = 0$) the susceptibility is strictly infinite in all the region of phase space where the market is efficient ($n \geq n_c$). This signals that a strong degeneracy in the optimal allocation strategies is cured by the presence of noise-traders and of information costs.

It is interesting to speculate, in passing, about possible extensions of this framework where information costs are endogenous. It is clear that information should be cheaper and cheaper the more the market is close to information efficiency. This suggests that, with endogenous information costs, the market should approach the critical line $\epsilon = 0^+$ with $n \geq n_c$, where the behavior of informed traders is characterized by infinite susceptibility.

This as well accounting for more realistic market dynamics with a proper price process, are interesting extensions of the present work.

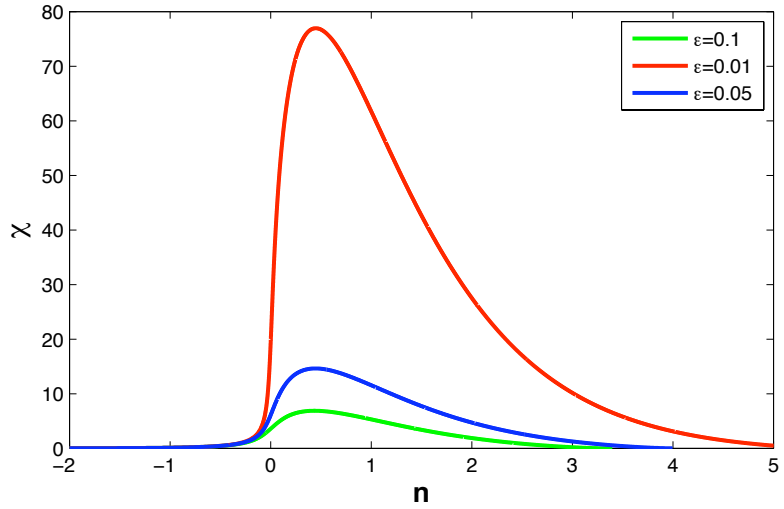

Figure 1: *Susceptibility as a function of market complexity for different information costs.*

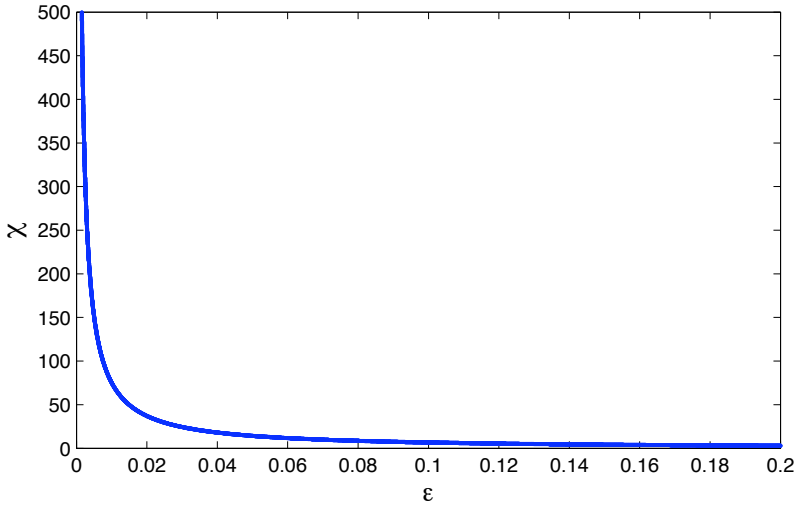

Figure 2: *Susceptibility as a function of information cost.*

In particular, as stressed by the Referee, it would be of great interest to merge our framework with the chartist-fundamentalist approach by Hommes et al., in order to see the relationship between information efficiency, fundamentalist and noise traders in a more realistic setting.

References

[Hommes 2006] Hommes, C. H., (2006), *Heterogeneous Agent Models in Economics and Finance*, Handbook of Computational Economics, in: Leigh Tesfatsion & Kenneth L. Judd (ed.), Handbook of Computational Economics, Vol. 2, 1109-1186 Elsevier.