

The interaction of non-linear and stochastic elements in a one-period model of asset price dynamics

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We consider a simple behavioural asset pricing model with fundamentalists and chartists who use different rules to update their expectations about the mean and variance of next period's asset price. Furthermore the agents switch strategies depending on a certain fitness measure. The dynamics of the model are non-linear in a way that is familiar from a recent literature. We also introduce stochastic elements through a noisy fundamental price and a noisy market clearing mechanism. We seek to study the relation between the time series and distributional characteristics of returns and the stability and bifurcation behaviour of the underlying deterministic non-linear dynamics. We find that both noise sources need to be active in order that the model generates the main stylised facts of financial asset prices. Furthermore much of the deterministic bifurcation structure becomes lost as the noise strength is increased beyond a certain threshold. Nevertheless the underlying deterministic nonlinear mechanism imparts certain characteristics to the return distribution.

Keywords: Fundamentalists, chartists, stability, bifurcation, auto-correlation, random- fixed points, stylized facts.

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