

One-Dimensional Discontinuous Piecewise-Linear Maps and the Dynamics of Financial Markets (*)

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Abstract

We present a simple one-dimensional discontinuous piecewise-linear agent-based financial market model in which prices evolve with respect to the trading activity of heterogeneous speculators. In line with empirical evidence, speculators rely on technical or fundamental trading rules to determine their orders. The general setup that comes out of our assumptions can be subdivided into various sub-models. We survey some analytical results obtained for these sub-models and illustrate how their deterministic skeletons are able to produce some important stylized facts of financial markets, including bubbles, crashes and excess volatility. We also develop and calibrate a stochastic version of the model that matches the dynamics of actual financial markets quite well. In fact, simulated returns are virtually unpredictable and display features like volatility clustering and long memory effects.

References

Gian Italo Bischi, Carl Chiarella, Iryna Sushko (Eds.): *Global Analysis of Dynamic Models in Economics and Finance: Essays in Honour of Laura Gardini*, Springer, Berlin, 2013.

() This work is dedicated to Laura Gardini whom FT has known since 2004 and whom FW met for the first time in 2005. Since then, Laura has never ceased to amaze us with regard to her ideas about nonlinear dynamical systems. We hope to have the pleasure of collaborating with her for many years to come.*