

AKSOE 14 Financial Markets and Risk Management III

Time: Thursday 16:00–18:00

Room: BAR 205

AKSOE 14.1 Thu 16:00 BAR 205

Application of Zhangs Square Root Law and Herding to Financial Markets — ●FRIEDRICH WAGNER — Institut fuer theoretische Physik, Universitaet Kiel, Leibnizstr.15, D-24098 Kiel

We apply an asymmetric version of Kirman's herding model to volatile financial markets. In the relation between returns and agent concentration we use the square root law proposed by Zhang. This can be derived by extending the idea of a critical mean field theory suggested by Plerou et al. We show that this model is equivalent to the so called 3/2-model of stochastic volatility. The description of the unconditional distribution for the absolute returns is in good agreement with the DAX independent whether one uses the square root or a conventional linear relation. Only the statistic of extreme events prefers the former. The description of the autocorrelations are in much better agreement for the square root law. The volatility clusters are described by a scaling law for the distribution of returns conditional to the value at the previous day in good agreement with the data.

AKSOE 14.2 Thu 16:30 BAR 205

Herding behaviour and persistence probabilities in the financial market — ●STEFFEN TRIMPER¹ and BO ZHENG² — ¹Fachbereich Physik, Martin-Luther-Universität, Friedemann-Bach-Platz, 06108 Halle — ²Zhejiang Institute of Modern Physics, Hangzhou, China

Economic systems such as financial markets are similar to physical systems far from equilibrium in that they are compromised of a large number of interacting agents. Therefore, methods established in statistical mechanics can be applied useful to describe certain aspects of financial systems. Here we concentrate us to three points. (i) The recently discovered two-phase phenomena in financial markets is examined with the German index DAX. We show that also an interacting herding model is able to produce the two-phase behaviour. (ii) A generalized dynamic herding model with feedback interactions is introduced within the Eguluz-Zimmermann model. Here the transmission of information at time t is assumed to be dependent on the variation of the index at a former time. Both the static and the dynamic behaviour of the correlation function are discussed. Moreover, we present a detailed analysis of the persistence probability of the German DAX and the Shanghai Index. (iii) Within daily and minutely data of the DAX and the Chinese Index we analyse the return-volatility correlation function, and find a leverage effect for the German market while an anti-leverage effect for the Chinese market. B.Zheng, F.Ren, S.Trimper, and D.F Zheng, *Physica A* 343, 653 (2004); F. Ren, B.Zheng, H.Lin, and S.Trimper, *Physica A* 350, 439 (2005), B.Zheng, T. Qui, F. Ren, and S. Trimper, Leverage and anti-leverage effects in financial markets.

AKSOE 14.3 Thu 17:00 BAR 205

Statistical properties of online auctions — ●ANDREAS SCHAD-SCHNEIDER and ALIREZA NAMAZI — Institut für Theoretische Physik, Universität zu Köln, 50937 Köln

Online auction sites like eBay have become increasingly popular over the last years. They use so-called 'second price auctions' where the final price is determined by the second highest bid. We have analyzed the statistical properties of a large number of auctions run on eBay.de. It is found that many observables (number of bids placed etc.) follow rather simple distributions. Also relations between variables typically are described by power-laws, e.g. in the case of the dependence of the final price on the number of submitted bids. We show that these properties help to identify a rather common form of fraud known as 'shill bidding'. Furthermore we analyze the distribution of bid submission times in order to determine the different strategies used by the agents.

AKSOE 14.4 Thu 17:30 BAR 205

Geometric motion in prices, and its limited validity. — ●ALESSANDRO SAPIO — LEM - Sant'Anna School of Advanced Studies - Piazza Martiri della Liberta' 33 - 56127 Pisa (Italy)

In research on speculative and commodity market dynamics, log-linear price models have been widely applied (e.g. Geometric Brownian Motion, multiplicative diffusion processes). Yet, recent studies on wholesale power markets cast doubts on the general validity of the log-linear property. Linear models outperform log-linear ones (Lucia and Schwartz, 2001, Review of Derivative Research), and the returns volatility goes like

the inverse of price (Bottazzi, Sapio and Secchi, 2005, *Physica A*).

This paper explores the limits to application of log-linear price models, and contributes with new insights on risk measurement and derivative pricing in markets with different institutional and technological features.

Spot pricing equations implied by periodic and continuous double auction settings are specified, and some conditions behind linear and log-linear price fluctuations are deduced. Geometric Motion emerges when individual orders are shaped by past prices (e.g. through forecasting rules, or as purchasing costs). This may not occur in power markets: trading is only based on current revenues and costs, because of non-storability.

Results are compared with predictions based on an alternative view - the efficient markets hypothesis - and the merits of the suggested framework are discussed.