SOE 19: Financial Markets and Risk Management II

Time: Thursday 16:15–17:00 Location: GÖR 226

SOE 19.1 Thu 16:15 GÖR 226

Fractal methods for fractional cointegration — •Ladislav Kristoufek — Charles University, Prague, Czech Republic — Institute of Information Theory and Automation, Czech Academy of Sciences, Prague, Czech Republic

Detrended fluctuation analysis (DFA) and detrending moving average (DMA) methods are standardly used for fractional differencing parameter d estimation. Recently, the DFA and DMA based estimators of standard regression parameters have been proposed. The estimators possess some desirable properties with regards to long-range dependence, trends, seasonalities and heavy tails. We study properties of both estimators beyond the general fractional cointegration framework, i.e. we examine a simple model $y_t = \alpha + \beta x_t + u_t$, where $x_t \sim I(d)$ and $u_t \sim I(d-b)$ which implies $y_t \sim I(\max[d, d-b])$. The fractional cointegration requires $b > 0$ while the standard cointegration $CI(1,1)$ assumes $x_t, y_t \sim I(1)$ and $u_t \sim I(0)$. We are interested in various combinations of d and b parameters ($0 \leq d, b \leq 1$, i.e. we cover not only the fractional cointegration framework). We provide a broad Monte Carlo simulation study focusing on different time series lengths, combination of d and b parameters, and on possible spurious relationships. Specifically, we compare the estimators based on DFA and DMA with the standard OLS procedure under true and spurious relationships ($\beta = 0$ and $\beta \neq 0$). Based on the bias, standard error and mean squared error of the estimators, the new procedures outperform OLS for various settings (e.g. with $d = 1$ and $b < 0.5$).

SOE 19.2 Thu 16:30 GÖR 226

Efficency of information processing systems — •Roland Rothenstein — Hannover, Germany

We present three new findings related to the efficient market hypothesis.

First we expand the focus for the definition of efficiency and its applications from markets to all information processing systems. Second we derive a formula to quantify the efficiency of such systems between 0% and 100% in dependence from given information. With the derived definition we thirdly show that the inefficiency of a system can have two different sources. One source is the possibility to use information to predict a concrete event with higher than chance level. The other is that the pricing/ quotes in the system does not reflect the probability distribution of the possible events.

Finally we demonstrate the calculation of efficiency on a simple toy model (tossing coin) to show how one can exactly quantify the efficiency of a system, if all probabilities are known.

SOE 19.3 Thu 16:45 GÖR 226

The efficient market hypothesis and the speed of light — •Robert Marx — TU-Dresden, Faculty of Business and Economics, Dresden, Germany

A structural change has been taking place in financial markets for about a decade, which led to its increasing technologization. Nowadays transactions are executed electronically on the exchanges and machines place orders based on algorithms. This allows a transaction rate of ever higher frequency. A part of this trade is called high-frequency trading. So far it is not clear how this kind of trade is to be judged. Much of the evidence suggests that it increases liquidity, translates new information faster into a price reaction, and thus generates more accurate prices. On the other hand, slower participants are suspended. In order to be able to assess the high-frequency trade, physical space must be included. For high-frequency traders, it plays a role where they are located in physical space relative to a stock exchange and the source of information. Their decision is influenced by the latency, which is determined by the speed of light in the used transmission medium and the bridged distance. Traditional financial models do not take into account any physical space or the principle of locality. In the context of the efficient market hypothesis (EMH), no judgment can be made regarding high-frequency trading as long as space is not included. Is it efficient? Is it fair? In the following, a model is presented, in which the EMH is examined more closely in a space-time metric.