AKSOE 2: Financial Markets and Risk Management I

Time: Monday 10:15–12:45 Location: H8

AKSOE 2.1 Mon 10:15 H8

There can only be one! — •Johannes Josef Schneider, Sebastian Golke, Tobias Preis, and Wolfgang Paul — Institute of Physics, Johannes Gutenberg University of Mainz, Staudinger Weg 7, 55099 Mainz, Germany

Demand and offer determine the price is a commonly accepted axiom in economics. However, when studying models simulating financial markets and containing this axiom as a key ingredient, we find that a small and decreasing group of agents aggregates all the assets and the money and dictates the price, until finally only one agent remains.

AKSOE 2.2 Mon 10:45 H8

Bounds for Value at Risk of currency portfolios — •Piotr Jaworski — Institute of Mathematics, Warsaw University, ul. Banacha 2, 02-097 Warszawa, Poland

In my talk I shall deal with the following simple case. An investor operating on an emerging market, has in his portfolio several foreign currencies which are highly dependent. Let s_i be the quotients of the currency rates at the end and at the beginning of the investment. Let w_i be the part of the capital invested in the i-th currency, $\sum w_i = 1$, $w_i \geq 0$. So the final value of the investment equals

$$W_1(w) = (w_1 s_1 + \cdots + w_d s_d) \cdot W_0.$$

The crucial point is to estimate the risk of keeping the portfolio. As a measure of risk I shall consider "Value at Risk"(VaR), which last years became one of the most popular measures of risk in the "practical"quantitative finance. Roughly speaking the idea is to determine the biggest amount one can lose on certain confidence level α

$$VaR_{1-\alpha}(w) = sup\{V : P(W_0 - W_1(w) \leq V) < 1 - \alpha\}.$$

The main result, I would like to present, is the following estimate of the Value at Risk of a given portfolio w in terms of Value at Risk of one-currency portfolios e_i:

$$\sum w_i VaR_{1-\alpha}(e_i) \geq VaR_{1-\alpha}(w) \geq \sum w_i VaR_{1-\alpha'}(e_i),$$

where $\alpha' = \frac{\alpha}{L(1,\ldots,1)}$. The above estimate is valid for sufficiently small α under the mild assumption that the lower tail part of the copula C of s_i's is homogeneous of degree 1, i.e. for sufficiently small q

$$C(q) = L(q), \quad \forall t > 0 \quad L(tq) = tL(q).$$

AKSOE 2.3 Mon 11:15 H8

Fractional relaxations superposed with oscillations and log-periodic bullish anti-bubbles on Warsaw Stock Exchange — •Marzena Kozłowska and Ryszard Kutner — Institute of Experimental Physics, Department of Physics, Warsaw University, Smyczkowa Str. 5/7, PL-02678 Warsaw, Poland

We analyse the dynamics of the Warsaw Stock Exchange indexes WIG and WIG20 at a daily time horizon before and after its well defined local maxima of the cusp-like shape decorated with oscillations. The falling paths of all indexes peaks can be described by generalised exponent or the Mittag-Leffler (ML) function superposed with various types of oscillations while the rising paths can be mainly described by bullish anti-bubbles. The former function is a solution of our model of index dynamics defined by the nonhomogeneous fractional relaxation equation. This solution is a generalised analog of an exactly solvable model of viscoelastic materials. The latter are a kind of log-periodic oscillations of market in the bullish state initiated by a crash. However, none of considered peaks of indexes can be viewed as the "finger print" of a dynamical critical phenomenon as financial market changes its state from the bullish to bearish ones before it reaches a critical region i.e. too early. This means that the Polish emerging financial market, although anomalous, should be considered as shy which can be reminiscence of a significant risk aversion of investors.

AKSOE 2.4 Mon 11:45 H8

Measure of risk: has it to be coherent — •Uli Spreitzer and Vladimir Reznik — Dr. Dr. Heissmann GmbH, 65189 Wiesbaden

Artzner et al. [1] postulated, that a measure of risk has to be coherent, i.e.translation invariance, subadditivity, positive homogeneity and monotonicity. Homogenous measures of risk are e.g. tail VaR or lower partial moments [2-3]. The often used VaR is not a homogenous measure of risk.

But a coherent measure means, that there a some assumptions a piori, which habe to be at least be discussed. E.g. the subadditivity of the homogenous means that putting two assembles - e.g. two insurance companies and their contracts - does decrease or at least not increase the risk of the two assembles. But this holds only by making some more postulates on this new larger assemble apriori.

When these postulates can not be fulfilled, a coherent measure of risk gives wrong informations on this new assemble and one should therefore use non coherent measures of risk as e.g. VaR.

[1]P. Artzner et al. Finance 9 (1999)3, 203-228 [2] V. Reznik, U.Spreitzer, talk 28th ICA, 28.5. - 2.6.2006, Paris [3] U. Spreitzer, V. Reznik, On the opt... Physica A (2007)

AKSOE 2.5 Mon 12:15 H8

A stochastic model for claim reserves in P&C insurance companies — •Magda Schiegl — Haydnstr. 6, 84088 Neufahrn

During the last few years holistic risk management has gained importance in banking and insurance business in connection with the new EU wide regulatory framework. In insurance industry the regulatory framework is called solvency 2. It is going to implement a new, efficient supervisory basis that enables the risk - orientated and principle based calculation of the economic capital. This is the capital shareholders should invest in the company in order to limit the probability of default to a given level within a given time horizon.

In property and casualty (P&C) insurance companies the claim reserves are a very important liability position in the balance sheet. They are necessary to cover the liabilities arising from insurance contracts written in the presence and past. We introduce a stochastic model for claim reserves. The model consists of two sub - models: One for the number of active claims and one for the claim pa0yments. Further we perform Monte Carlo simulations on the basis of this model. The result is the probability distribution of the reserves. This is the basis for further risk calculation and management in P&C insurance companies.