

Opponent report on the Ph.D. thesis  
"Options under Stable Laws"  
by mgr. Andrea Karlová

It follows from the title that the main results of the thesis have to be connected to mathematical modeling of some financial phenomena, namely, to options. However, it is not the case. Already, in Abstract author writes about the importance of stable distributions, about the tools used for their study, and almost nothing about options under stable laws. Consideration of the thesis shows us that the notion "option" is not the main one for the work. Namely, corresponding studies (including historical remarks) are concentrated on less than 25 pages from 72 pages of the whole thesis. In the Literature there are only 3 references to the works on the use of heavy-tailed (particularly, stable) distributions in financial problems, and there is no citation of the papers or books published after 1999. However, there exist a lot of publications about applications of stable distributions (Lévy Flights) in finance. It is sufficient to mention the book FINANCIAL MODELS WITH LÉVY PROCESSES AND VOLATILITY CLUSTERING by S.T. Rachev, Y.S. Kim, M.L. Bianchi, and F.J. Fabozzi, 2011, John Wiley & Sons, Inc. Hoboken, New Jersey, and Literature in this book. Besides, there are the models connected with generalizations of Lévy Flights. Namely, there were considered smoothly truncated Lévy Flights and modified tempered Lévy Flights (see, for example, A MODIFIED TEMPERED STABLE DISTRIBUTIONS WITH VOLATILITY CLUSTERING by Y.S. Kim, S.T. Rachev, D.M. Chung, M.L. Bianchi or THE MODIFIED TEMPERED STABLE DISTRIBUTION, GARCH MODELS AND OPTION PRICING by Young Shin Kim, Svetlozar T. Rachev, Dong Myung Chung, Michele Leonardo Bianchi, Probability and Mathematical Statistics, Vol. 29, Fasc. 1 (2009), pp. 91–117).

In thesis there are given no comparisons with existing models. No applications to real life data analysis were obtained.

However, if we would change the title, say, on "Stable distributions and their possible applications to finance", the situation becomes much better. Really, the main object would be stable distributions and their properties, and therefore chapters 2 - 4 (pages 4 - 62) of the thesis contain the main results.

Among the main results, I would like to mention

1. Getting new expressions of stable densities through some special functions;
2. Finding the density of the product of independent stable random variables;
3. Expression of the density in terms of power series, as well as in terms of special functions;

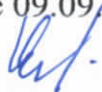
4. Establishing of the option pricing formulas in terms of power series.

One remark: equation (2.15) is not the Cauchy equation (contrary to the assertion of the author ) and it has to be solved by another method.

Basing on all above, I can say that the dissertation under review is new, interesting, and may be allowed to defend.

V Praze dne 09.09.2013

Professor



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