Report on **Master Thesis**

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

Student:	Michal Lebovič
Advisor:	PhDr. Petr Teplý, Ph.D.
Title of the thesis:	The Use of Coherent Risk Measures in Operational Risk Modeling

OVERALL ASSESSMENT *(provided in English, Czech, or Slovak):*

The thesis explains the framework of measuring operational risk in financial institutions. It is an interesting piece of work, well written and of appropriate scope. Author seems to be very well educated in the area of operational risk measurement and he surely shows his ability to write academic text.

I didn't like the way of typing mathematical expressions as I am used to LaTex and I don't like using the same type of font for mathematical expressions as well as regular text. This can be seen in the mathematical definition of Poisson distribution, however in the expression describing the non-parametric approach the font used for the word „with" is typed correctly. I would also very appreciate if the author had numbered the expressions that are typed on their own (not directly in the text) so I could now easily write down the numbers instead of describing which equation I have in mind. I know in the articles usually only those expressions that are reffered in the text should be numbered, however those that are not may mostly be abandoned. Master thesis can be different in this respect and so I would rather use the numbering for all mathematical expressions that stand alone.

I didn't like the expression: „Their maximum likelihood estimators can be defined as follows:" on page 21, because as long as we know what we call a maximum likelihood estimator, we compute the particular MLE for different parameters and not „define" them. Author does not in fact mention any definition, he just writes down, what are the MLE of the parameters of the log-normal distribution.

I do not understand what does the „heavier scales" means on the page 22. Shouldn't there be „heavier tails"?

According to the h-and-g distributions, I would also suggest the author to take a look on the class of so called „stable distributions" which are of heavy tails as well. I am not sure what is exactly the difference of the h-and-g distributions and stable distributions, whether there are some that could be considered being stable and h-and-g at the same time, or not. However both classes suffer from similar pains, however for the stable distributions at least we are always able to write down its characteristic function analytically. Maybe author should also mention Vasicek's distribution of losses, although it is more often used for credit and not operational risk.

The expression at the bottom of page 26 is typed horribly. In the middle of page 30, there is written „it is it is" and on page 36 there is written „when losses the losses are". On page 33, author describes probability space. He describes it in detail, but forgets to mention that he is using probability measure. Moreover I am not sure, if the set of positive real-valued random variables should realy be an element of its extension, or just its subset. I understand the extension to be a set of random variables, not set of sets of random variables. Similarly as set of positive integers contains just each positive integer, but set of odd numbers is not its part as clearly the set of odd numbers is not a positive integer.

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I do not consider the figure 3.2 to be sufficiently illustrative as the Expected Shortfall seems to be (as it is depicted in this figure) a convex combination of maximal possible loss and VaR, which is in fact not the case as it is defined as a convex combination of VaR and expected loss conditioned by having loss higher than the VaR, which is surely lower than the maximal possible loss.

Author states that „On the other hand, ES is continuous with respect to alpha for general distributions…", but this is surely not true. Maybe author just wanted to write that for absolutelly continuous distribution functions, ES would also be continuous in alpha (or something similar).

On page 53 author states that ES/VaR is by definition always greater than 100%, but this is not true as it can be as well equal to 100% if there is no higher loss than VaR simulated (which can happen in the case of discrete distributions-otherwise the ES is not coherent anyway). On page 57 there is written „We repeat this process is repeated …". Some other minor misprints and other language mistakes can be found in the work, but their frequency does not exceed a common scope.

I didn't go over all the equations as that would be very time demanding, so I trust the author, that they are copied from the source literature correctly. I consider the work fully competent and interesting, showing the author's full ability to write a profesional economic text. My impression is that the author's original contribution, although it is just empirical and not much analytically demanding, is quite sufficient even for one of the best theoretical economic schools in the Czech Republic and there is no way to propose anything else than give the grade 1 („výborně").

SUMMARY OF POINTS AWARDED *(for details, see below):*

CATEGORY		POINTS
Literature	*(max. 20 points)*	20
Methods	*(max. 30 points)*	21
Contribution	*(max. 30 points)*	21
Manuscript Form	*(max. 20 points)*	19
TOTAL POINTS	*(max. 100 points)*	**81**
GRADE	**(1 – 2 – 3 – 4)**	**1**

NAME OF THE REFEREE: Pavel Doležel

DATE OF EVALUATION: 21.6.2012

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Referee Signature

EXPLANATION OF CATEGORIES AND SCALE:

LITERATURE REVIEW: *The thesis demonstrates author's full understanding and command of recent literature. The author quotes relevant literature in a proper way.*

Strong	Average	Weak
20	10	0

METHODS: *The tools used are relevant to the research question being investigated, and adequate to the author's level of studies. The thesis topic is comprehensively analyzed.*

Strong	Average	Weak
30	15	0

CONTRIBUTION: *The author presents original ideas on the topic demonstrating critical thinking and ability to draw conclusions based on the knowledge of relevant theory and empirics. There is a distinct value added of the thesis.*

Strong	Average	Weak
30	15	0

MANUSCRIPT FORM: *The thesis is well structured. The student uses appropriate language and style, including academic format for graphs and tables. The text effectively refers to graphs and tables and disposes with a complete bibliography.*

Strong	Average	Weak
20	10	0

Overall grading:

TOTAL POINTS	GRADE		
81 – 100	1	= excellent	= výborně
61 – 80	2	= good	= velmi dobře
41 – 60	3	= satisfactory	= dobře
0 – 40	4	= fail	= nedoporučuji k obhajobě