Report on Bachelor / Master Thesis

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

Student:	**Inés Horváthová**
Advisor:	**RNDr. Michal Červinka, Ph.D.**
Title of the thesis:	**Robust portfolio selection**

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

In her thesis, Inés Horváthová focuses on portfolio optimization using mean-risk models with three different measures of risk: variance, VaR and CVaR. First, she formally introduces the three risk measures, then she defines the respective portfolio optimization models and their more robust counterparts and finally, she applies the basic and the more robust mean-variance models on real data and compares the results.

Despite somewhat confusing notation at some points, the theory seems to be properly summarized and the results are clearly described; nice plots are provided. Yet, there are some details, which, from my point of view, are problematic. To discuss each evaluation category separately:

Literature: The use of literature is at a good level, the publications listed seem to be both relevant and well used to support the author's statements, although higher proportion of more recent literature in the references would be, in my opinion, better. What I am missing is a literature review section, where the author would attempt to summarize some of the most important publications on both the traditional methods and the recent trends in the robust mean-risk portfolio optimization. Next, focusing on the citations, I would suggest to use either the Harvard-style, or at least to use properly the Vancouver-style. Next, one of the publications listed ([13]) is not referred to in the text, but I believe that it is just by mistake, just like the multiple use of the same (just translated) sentences as in one of the publications listed ([30]). The latter problems are evaluated together with the overall manuscript form under the respective category.

Methods: The methods used in the work seem to be correct and clearly described, although the discussion of the empirical analysis results might be more detailed and the extent of the theoretical part should be more in line with the extent of the empirical analysis. The overall level of the empirical analysis could be, in my opinion, more advanced. Moreover, in some cases, while reading the theoretical part, it does not seem to me that the author really understands what she is writing (see " Additional questions" at the end of the report).

Contribution: In general, I see the main contribution in the advancement of the authors' knowledge, skills and experience, which she might appreciate in her further studies and/ or in her job. In my opinion, the student could gain more by perfection of the formal aspect of the work, as well as by extending the empirical analysis.

Manuscript Form: The form of the work is at a fairly good level, although significant improvement is possible. Especially, I would suggest to rewrite the introduction, since it is not clear and properly organized, as well as it would be nice to make the whole text more fluent and to make it sure that every paragraph is there for a good reason, not just to make the text longer. Most importantly, after reading the theory and going through the empirical part, results for VaR- and CVaR-based models seem to be missing, even though they are not planned to be applied since the very beginning. I would suggest either to provide results also for these models, or to limit the space dedicated to these models in the theoretical part, since I do not see the point of their extensive description, when they are not referred to in the empirical part. The problems with citations were already mentioned. Finally, I would suggest

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double-checking the institute's name ("Institute of Economic Studies and Journalism") in the bibliographic info?

The suggested questions for the defense are:

- Why are VaR and CVaR defined in the theoretical part and not considered in the empirical part?
- Why is diversification called a "naive solution to risk minimization" (p.23)?
- How were the assets included in the portfolio chosen?
- If the author was to use the thesis as a basis for her Master's thesis, in which direction would she continue the research?

*Additional questions:
- Could the author explain in detail the link between higher value of a portfolio and lower risk under monotonicity (p.6-7)? (assumptions missing?)
- Could the author explain in detail the translation invariance, in particular the part how she gets the risk-free investment by "adding a risk-free constant value of the portfolio risk to our financial position" (p.7)?
- Could the author explain in detail the difference between the translation invariance and the shift invariance (p.7)?
- Could the author explain in detail what the "non-constant portfolio" (that implies positive risk) means (p.8)?
- Could the author explain the statement that " The methods (of VaR estimation) are inconsistent even when the same method is used by different companies..." (p.16)?

In the case of successful defense, I recommend the grade **" good " ("velmi dobře" , 2)**

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

CATEGORY		POINTS
Literature	*(max. 20 points)*	15
Methods	*(max. 30 points)*	19
Contribution	*(max. 30 points)*	22
Manuscript Form	*(max. 20 points)*	13
TOTAL POINTS	*(max. 100 points)*	**69**
GRADE	**(1 – 2 – 3 – 4)**	**2**

NAME OF THE REFEREE: Lucie Kraicová

DATE OF EVALUATION: 29.08.2014

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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