

# Report on Bachelor Thesis

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

<b>Student:</b>	<b>Nikanor Goreglyad</b>
<b>Advisor:</b>	<b>Mgr. Marek Hauzr</b>
<b>Title of the thesis:</b>	<b>The LSTM approach for Value at Risk prediction.</b>

## OVERALL ASSESSMENT

### Short summary

The submitted bachelor thesis looks at Value at Risk prediction through the usage of LSTM networks with Joint Supervision loss function. The Value at Risk prediction is done on Visegrad Four stock indices returns. The model is benchmarked against two standard models.

### Contribution

The author uses a novel method for Value at Risk estimation. As far as I know this methodology is not often used in the literature and even less in the finance. This brings an interesting view on predictability of these markets and especially on their behaviour in the tails.

### Methods

The Long-Short Term Memory neural networks architecture combined with a Joint Supervision loss function is used. The methodology is described in sufficient detail and well enough.

The benchmark methods used to compare the predictions of the main model are FIGARCH and EVT-POT. To reach a perfect state I would like to see here is a quantile regression (linear or in a neural network form) as a benchmark model. However, the selected benchmark models are more than sufficient, especially for a bachelor thesis.

Overall I consider this methodology to be closer to masters thesis, especially when I consider the wide range of methodologies used.

### Literature

The literature review section is well written and easy to follow. The main topics in the area are well covered.

### Manuscript form

The text is well structured in a logical order into chapters, sections and subsections. The tables and graphs are well commented in the text and are well referenced within the thesis. The only remark I have is that table 5.3 could be more condensed for better readability.

### Overall evaluation and suggested questions for the discussion during the defense

Overall I consider the thesis to be well written, easy to read and follow. The author showed ability to work on his own, research and understand academic papers and write a bachelor thesis. The cooperation with the author was very pleasant, he took all the feedback and adjusted the thesis where necessary and when he disagreed he was able to argue quite well why he did what he did.

In my view, the thesis fulfills the requirements for a bachelor thesis at IES, Faculty of Social Sciences, Charles University, I recommend it for the defense and suggest a grade A.

The results of the Urkund analysis do not indicate significant text similarity with other available sources.

For a discussion during the defense I would like to suggest asking the author following:

- How is the chosen method different to quantile regression and possibly quantile regression neural networks?
- Secondly I suggest asking how the final hyper parameters of the presented model were selected, was that based on previous papers, manual testing, some hyper parameter optimization?

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

<b>CATEGORY</b>	<b>POINTS</b>
<i>Contribution</i> (max. 30 points)	28
<i>Methods</i> (max. 30 points)	27
<i>Literature</i> (max. 20 points)	20
<i>Manuscript Form</i> (max. 20 points)	19
<b>TOTAL POINTS</b> (max. 100 points)	<b>94</b>
<b>GRADE</b> (A – B – C – D – E – F)	<b>A</b>

**NAME OF THE REFEREE:** *Mgr. Marek Hauzr*

**DATE OF EVALUATION:** *29.8. 2021*

Digitálně podepsáno (29.8. 2021):  
Marek Hauzr

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**Referee Signature**

**EXPLANATION OF CATEGORIES AND SCALE:**

**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.*

**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.*

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

**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.*

**Overall grading:**

TOTAL	GRADE
91 – 100	A
81 - 90	B
71 - 80	C
61 – 70	D
51 – 60	E
0 – 50	F