

Report on Master Thesis

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

Student:	Karolina Chalupova
Advisor:	Jozef Barunik
Title of the thesis:	Can Machines Explain Stock Returns?

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

Please provide your assessment of each of the following four categories, summary and suggested questions for the discussion. The minimum length of the report is 300 words.

Contribution

The work fits well into the current surge of promising literature that considers use of machine learning in Finance. While this literature including several important contributions in Top Finance journals argue that machine learning brings significant advancements to asset pricing and can improve forecasts of stock returns, such results lack interpretability. In other words, machine learning brings promising results for a forecaster, but we do not understand the source of the improvements, nor identify the effects driving such results. Since this is a critical point for an economist, number of researchers are interested in looking at interpretability of machine learning methods.

The thesis under consideration constitutes one of the first attempts to explain superior return forecasts of stock returns using machine learning methods and constitutes one of the first attempts to interpret the machine learning results. Considering the nicely written general interest motivation, well executed and rigorous analysis and robust results, the thesis constitutes an excellent contribution that would be publishable in a solid Finance journal.

Methods

Karolina uses modern machine learning tools including neural networks that are far beyond the standard curriculum and require deep advanced knowledge of statistics as well as programming skills. It is noteworthy that Karolina worked with large datasets and the estimation itself requires huge amount of work. In addition, Karolina needed to suggest a proper frameworks and tools to be able to interpret the results as she aimed, and she managed this task very well. The degree of detail Karolina understood the methods is remarkable. Even more important, Karolina also showed deep understanding of classical finance problems and mastered the thesis on very high level.

Literature

Karolina demonstrates deep understanding of the finance as well as machine learning literature and gives credit to all important as well as relevant studies. The author works with relevant literature properly and develops her own original ideas based on proper understanding of the previous literature. With this respect, Karolina provided excellent work.

Manuscript form

The text is logical, well written, connects findings to the existing literature well. Karolina worked consistently to obtain the results for long period, and we have discussed the results and text on a regular basis during the time together with her consultant, as well as during the last stage of writing. Formally, manuscript meets all requirements.

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Summary and suggested questions for the discussion during the defense

In conclusion, I believe that during the work Karolina proved herself to be an independent researcher, she obtained interesting original results, mastered advanced econometric techniques, and finally was able to use all these skills to deliver sound and economically relevant work. Hence the thesis deserves to be defended without doubts. In case Karolina is confident in presenting the details of the work during the defence, and especially present economic motivation and importance of the discussion and implications of her findings, I suggest to award the work with grade „A“.

A good issue for the discussion during the defence would be if Karolina could explain what - in her view - are the key next steps in the identifiability of machine learning approach in finance.

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

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

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

NAME OF THE REFEREE: Jozef Barunik

DATE OF EVALUATION: January 19, 2021

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