Opponent's Report on Dissertation Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University
Opletalova 26, 110 00 Praha 1, Czech Republic
Phone: +420 222 112 330, Fax: +420 222 112 304

Author:	**Martin Hronec**
Advisor:	Doc. PhDr. Jozef Baruník Ph.D. (IES)
Title of the Thesis:	Asset Pricing and Portfolio Selection via Machine Learning
Type of Defense:	**DEFENSE**
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Opponent**:**	Maria Grith Ph.D. (Erasmus University Rotterdam)

Address the following questions in your report, please:

a) Can you recognize an original contribution of the author?
b) Is the thesis based on relevant references?
c) Is the thesis defendable at your home institution or another respected institution where you gave lectures?
d) Do the results of the thesis allow their publication in a respected economic journal?
e) Are there any additional major comments on what should be improved?
f) What is your overall assessment of the thesis? (a) I recommend the thesis for defense without substantial changes, (b) the thesis can be defended after revision indicated in my comments, (c) not-defendable in this form.

Date:	23 April, 2025
Opponent's Signature:	
Opponent's Affiliation:	Maria Grith Ph.D. (Erasmus University Rotterdam)

Final Report on the Dissertation Thesis "Asset Pricing and Portfolio Selection via Machine Learning" by Martin Hronec

Reviewer: Dr. Maria Grith

General

The thesis is an innovative collection of three essays that utilize machine learning to forecast (i) global stock returns and (ii) multiple quantiles of stock returns. In addition, it examines the implications of these predictions for portfolio allocation among investors with quantile preferences.

In the previous report, I focused on specific aspects of Chapters 2 and 3 of the thesis.

Discussion

Chapters 3

The innovation of this essay lies in the proposal of a two-stage neural network (2sNN) designed to forecast return distributions, specifically multiquantiles. This approach addresses two critical pieces of information: (1) stock-specific characteristics and (2) macro-financial variables. By combining these elements within a single framework, the method is not only

innovative but also versatile, showcasing technically impressive execution. In the current version, a comprehensive study of robustness and model selection provides deeper insights into the empirical behavior of the proposed method. Figure 2.2 and the pseudo-algorithm detailed in Appendix 2.E.4 enhance the clarity of this approach, increasing its potential for broader applicability. Furthermore, the author has markedly improved Section 2.2.2, which details the method and compares it to existing ones in the literature, underscoring its relative strengths.

Chapters 4

This essay presents a timely study that investigates broader classes of preferences represented by quantile preferences. Unlike the global minimum variance portfolio, which relies solely on the first two moments of a distribution, quantile maximization necessitates information from the entire distribution, making it a complex problem to solve. The author addresses this challenge using mixed integer linear programming. In Section 3.3, the author outlines the theoretical framework relevant to this issue in a clear and intuitive manner. He demonstrates that fully exploiting the potential of this approach in practice is challenging, suggesting that further research is needed. The essay can serve as the foundation for an exciting line of research, and the author has established a strong basis for ongoing inquiry.

Recommendation

The author has thoroughly and diligently addressed the questions, making the thesis a relevant and well-crafted work that, in my opinion, has potential for publication in top journals. Therefore, I recommend the thesis for defense without substantial changes.