Graduate School of Finance

Empirical Asset Pricing 2023-2024

Term paper instructions

The deadline of the term paper is **January 31, 2024**. Please send it, as a pdf-file, directly to me (peter.nyberg@aalto.fi).

Hou, Xue, and Zhang (2015, 2020) propose a q-factor model that appears to describe the cross-section of stock returns reasonably well. Around the same time, Fama and French (2015) propose a five-factor model as an extension to their earlier three-factor model. Your task is to compare these two models. Choose some sets of test portfolios, motivate your choice of portfolios well, and compare the performances of these two models. Use well-chosen, and preferably a variety of, test methods (remember to motivate your methodological choices well – how are the methods connected to the economic questions we are trying to answer and how do the methods differ from each other?). Remember to look at both the statistical significance and the economic significance of the two models. I also expect you to write a brief literature review around this topic. What are the economic motivations behind the factors included in these models and what do we currently know about these models' performance? Don't worry, you empirical results do not necessarily need to provide new knowledge with respect to the previous papers written around this same research topic.

The Fama-French factors and a variety of test portfolios can be found at Kenneth French's homepage, available at

http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

The q-factors, and even a wider selection of test portfolios, are available at

http://global-q.org/factors.html

It might be a good idea to familiarize yourself with some background literature connected to this theme. A good starting point are papers written by Lu Zhang and his coauthors, available at

https://theinvestmentcapm.com/research.html

Of course, you should read papers written by other authors also.

My grading will largely be based on the depth and breadth of your empirical analysis. Mindlessly applying some statistical tests and simply reporting some t-values will not lead to a good grade. Even a first-year master's student would be able to do that, and we are well above that level already. If a test rejects, I would very much want to know *why* it rejects. Is the rejection due to the fact that the model cannot explain the returns on one extreme portfolio, or are there some more serious problems with the model you are estimating? Even if the tests do not reject, are the estimates in line with the theoretical predictions? Why do you choose to use the Hansen-Jagannathan (1997) weighting matrix in GMM-estimations rather than using the identity or the optimal weighting matrix? Is the GLS R^2 better than the OLS R^2, and if they differ significantly from each other, why might this be? And so on, and so on... you get the picture? Show that you understand what's going on in the data and in your estimations. Furthermore, try to connect your analysis of both the statistical and financial issues to the literature (the papers that are included in your reading list for the course are a good start...).

To get robust results, I would prefer you to use more than one empirical test method. One of the aims of this term paper is that you get the chance to show that you understand the methods that we have covered during the course. And of course, you will also be rewarded for innovativeness in your research design.

Write your paper in the form of a scientific journal article. Include an abstract, an introduction, a background section, an empirical section and conclusions. But of course, put most of the emphasis on the empirical part.

Guideline for the length of the term paper: about 25 pages (including references and tables). Note that this is a guideline, not a strict requirement.

References

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1), 1-22.

Hou, K., Xue, C., & Zhang, L. (2015). Digesting anomalies: An investment approach. *The Review of Financial Studies*, 28(3), 650-705.

Hou, K., Mo, H., Xue, C., & Zhang, L. (2020). An augmented q-factor model with expected growth. *Review of Finance*, forthcoming.