Advanced Econometrics for Financial Markets

Term paper instructions

Students have the option to write the term paper individually or in groups of 2-3 students. The paper should critically summarize and/or replicate an academic article published in one of the leading academic finance journals. This document contains further instructions and grading guidelines.

1. Selecting an academic article on financial markets

Select an empirical article (i.e., an article in which the main result is empirical) that aligns with the course topics, including cross-sectional return predictability, time-series return predictability, return skewness and volatility, but also market microstructure, trading, investment funds, portfolio choice, derivatives, and related areas. The article must be **published after 2010 in one of the following leading journals**:

Journal of Finance

Journal of Financial Economics

Review of Financial Studies

Review of Finance

Journal of Financial and Quantitative Analysis

Management Science

At the end of this document is a list of example articles and **excluded** articles**. <u>Make sure that your selected article is not on the excluded list.</u>** Feel free to ask feedback from the teacher regarding your choice of article.

2. Critical summary of the article's contribution

Summarize the article in your own words (i.e. do not copy-paste directly from the article). Specifically, your report should contain the following information:

What is the **main research question** in the article? Do the authors provide any hypotheses, originating from economic theory or prior empirical results? (often articles do not explicitly state their hypotheses, but the hypotheses may be revealed "between the lines").

What **methods and data** do the authors use to answer the main research question? To what extent are the data and methods novel? (In many articles neither data nor methods are novel)

What is the **main result of the article**? Copy-paste the table that contains (in your opinion) the main result of the article to your report and write down explicitly why and how the numbers in

the table answer the main research question (if needed, the table can be supplemented by a figure from the article illustrating the main result).

Provide a **critical assessment of the article**, e.g.: Do you believe that the reported results provide a convincing answer to the main research question? Can you think of alternative explanations for the observed patterns in the data? Are these or other alternative explanations addressed by the authors? Do the authors discuss the robustness of their main result? Can you think of additional robustness checks that would help you believe the results?

3. Replication of the article's main result

Gather data to empirically verify (or refute) the main result in the article. It is not expected to replicate every result in the article and the replication does not need to be exactly numerically identical to results in the published article. Using the information provided in the article, try to replicate the main result to a ballpark approximation.

When selecting an article (step 1), it is important to consider the **feasibility** of replication, ideally before investing too much time into summarizing the paper. Articles relying on **portfolio returns** (e.g., from the Kenneth French data library) are typically easier to replicate than those using **individual stock returns**. It may be possible to use portfolio returns for replication, even if the article itself uses individual stock returns.

Many authors provide data on their website, or on the journal website. It is perfectly acceptable to use these resources. For example, if an article proposes a new predictor of market returns and the authors provide the predictor on their website, you could gather market returns yourself, and use the predictor provided by the article's author.

Finally, make sure that the paper uses methods that you are able to apply yourself.

Your report should provide your replication approach (sources of data, choice of method, steps taken in the replication process) and replication result. If your replicated result deviates significantly from the published result, investigate and describe potential reasons for the discrepancy. Consider differences in data, methodological assumptions, or computational errors.

After replicating (or failing to replicate) the main results, you can enhance the baseline replication by adding a "twist", i.e. a novel element, such as collecting new data (e.g., more recent data or using an alternative variable definition) or applying an alternative method. Analyze whether the results are robust to this variation. Discuss what these findings reveal about the original study's conclusions.

4. Format of term paper and submission guidelines

Write a short (10-20 pages, font size 12) report containing your summary and replication. The first page should list your name(s) and student numbers, and the title, authors, journal, and year of publication of the summarized/replicated article.

You are permitted to use AI tools (e.g., ChatGPT) when working on this project. For example, AI tools can be useful for understanding the contribution of an article, to brainstorm ideas, to provide coding assistance, and to obtain feedback on your writing. It is **not acceptable** to present AI generated text as your own independent work. Any large sections of text copied from an AI tool and presented as original work will be considered **plagiarism**. Suspicion of plagiarism will be investigated and can lead to a reduction in grade or other disciplinary measures. See Aalto University Code of Academic Integrity in Studies.

Submit the term paper in pdf format on MyCourses. In case of groupwork, only one of the students need to submit the paper. Make sure all names and student numbers are on the front page. The submission deadline is on MyCourses. **Late submissions are not accepted**.

In addition to the term paper, submit a .zip file (<400MB) with your replication code and data. I will not consider the quality of the code in the term paper assessment, but I may look at the code to see how a result was obtained. If the dataset is too large to share (>400MB), submit a .zip file with the codes only. You should save the data, as I may ask for the datafiles to be shared through another system.

5. Grading criteria and evaluation rubric

The term paper will be evaluated on a scale of 0-25. The grading will be based on the quality and depth of the critical summary and on the quality and interpretation of the replication. Note that a failed replication is not necessarily a bad outcome. Some published results are simply incorrect or are highly sensitive to specific assumptions or empirical choices. This is why replication is an important part of scientific discourse.

The evaluation rubric below provides guidelines for the assessment:

0 points: No term paper submitted.

5 points: Term paper includes a summary of the paper. Lacks a deep critical assessment of the main result. No serious replication results reported.

10 points: Clear summary identifying the main result and contribution of the article. Good attempt at replicating the main result.

OR Clear summary identifying the main result and contribution of the article including a deep critical assessment. No serious replication results reported.

15 points: Clear summary identifying the main result and contribution of the article including a deep critical assessment. Good attempt at replication of main result.

20 points: Clear summary identifying the main result and contribution of the article including a deep critical assessment. Good attempt at replication of main result. Adds a minor "twist" to the baseline replication: New data, alternative methods, etc.

25 points: Clear summary identifying the main result and contribution of the article including a critical assessment of the article. Good attempt at replicating the main result and adds a significant "twist" to the baseline replication. The term paper explains the importance of the twist and really adds new value beyond the original published paper.

Note that is possible to earn 10 points without any replication attempt, as long as the article summary is of high quality. It is possible to earn up to 15 points with a minimal attempt at replication of the main result. To earn 20-25 points, a deeper independent contribution is expected.

Some term papers may not fit perfectly into one of the categories described above or may fall between two categories. In such cases, grades will be determined by selecting a value between 1 and 25, based on the guidelines described above.

This is a 6 ECTS course, equating to an estimated total workload of approximately 165 hours (6 x 27.5). The term paper constitutes 25% of the final grade, implying an expected workload of around 41.25 hours to achieve a high-quality submission.

6. Sources, suggested articles and excluded articles

The following list includes useful **data sources** (remember that data sets for specific articles are often published on the author's website or as supplementary materials in the journals). Many papers can be replicated using portfolio data or aggregate market-level data, i.e. avoiding firm-level returns and accounting variables. Given the tight schedule, I recommend to avoid using international (non-US) firm-level data.

- Kenneth French data library: Data on factors, industry portfolios and characteristic-sorted portfolios. Mainly US, but also selected international.
- Open Source Asset Pricing: hundreds of firm-level characteristics (US stocks) that are published in top finance journals as cross-sectional return predictors. Includes publication dates, panel data on the actual predictors, as well as long-short portfolios based on each characteristic. See also Chen, A. Y., & Zimmermann, T. (2021). Open source cross-sectional asset pricing. *Critical Finance Review*
- Q-factor data library: data on factor and characteristic-sorted portfolios.
- Global Factor data: firm-level characteristics (US stocks). Jensen, Kelly, and Pedersen (2023), *Journal of Finance*
- Open Source Bond Asset Pricing
- AQR data sets: data on several factors across different asset classes.
- FRED: Macroeconomic data (consumption, GDP, inflation, etc.)
- CRSP/COMPUSTAT through WRDS: US firm level characteristics and returns
- Aalto Finance Database Wiki: instructions for the use of commercial databases to which Aalto has a subscription, including CRSP and Datastream.

The following two articles are excluded, since we will already discuss and (partially) replicate these during the course:

- Bessembinder, H. (2018). Do stocks outperform treasury bills?. Journal of financial economics, 129(3), 440-457.
- Frazzini, A., & Pedersen, L. H. (2014). Betting against beta. Journal of financial economics, 111(1), 1-25.
- Jylhä, P. (2018). Margin requirements and the security market line. The journal of finance, 73(3), 1281-1321.
- Barroso, P., & Santa-Clara, P. (2015). Momentum has its moments. Journal of Financial Economics, 116(1), 111-120.

Below is an (incomplete) list of **example articles** that rely on feasible methods and can be replicated with datasets that are *relatively* straightforward to compile. Feel free to pick an article from this list **or any other article** that satisfies the criteria in Section 1.

- Asness, C. S., Moskowitz, T. J., & Pedersen, L. H. (2013). Value and momentum everywhere. The journal of finance, 68(3), 929-985.
- Atanasov, V., Møller, S. V., & Priestley, R. (2020). Consumption fluctuations and expected returns. The Journal of Finance, 75(3), 1677-1713.
- Cederburg, S., O'Doherty, M. S., Wang, F., & Yan, X. S. (2020). On the performance of volatility-managed portfolios. Journal of financial Economics, 138(1), 95-117.
- Chen, Z., Da, Z., Huang, D., & Wang, L. (2023). Presidential economic approval rating and the cross-section of stock returns. Journal of Financial Economics, 147(1), 106-131.
- Da, Z., Engelberg, J., & Gao, P. (2015). The sum of all FEARS investor sentiment and asset prices. The Review of Financial Studies, 28(1), 1-32.
- Ehsani, S., & Linnainmaa, J. T. (2022). Factor momentum and the momentum factor. The Journal of Finance, 77(3), 1877-1919.
- Garrett, I., & Priestley, R. (2012). Dividend growth, cash flow, and discount rate news. Journal of Financial and Quantitative Analysis, 47(5), 1003-1028.
- Jondeau, E., Zhang, Q., & Zhu, X. (2019). Average skewness matters. Journal of Financial Economics, 134(1), 29-47.
- Keloharju, M., Linnainmaa, J. T., & Nyberg, P. (2016). Return seasonalities. The Journal of Finance, 71(4), 1557-1590.
- Koijen, R. S., Moskowitz, T. J., Pedersen, L. H., & Vrugt, E. B. (2018). Carry. Journal of Financial Economics, 127(2), 197-225.
- Li, J., & Yu, J. (2012). Investor attention, psychological anchors, and stock return predictability. Journal of financial economics, 104(2), 401-419.
- McLean, R. D., & Pontiff, J. (2016). Does academic research destroy stock return predictability?. The Journal of Finance, 71(1), 5-32.
- Møller, S. V., & Rangvid, J. (2015). End-of-the-year economic growth and time-varying expected returns. Journal of Financial Economics, 115(1), 136-154.
- Moreira, A., & Muir, T. (2017). Volatility-managed portfolios. The Journal of Finance, 72(4), 1611-1644.

- Moskowitz, T. J., Ooi, Y. H., & Pedersen, L. H. (2012). Time series momentum. Journal of financial economics, 104(2), 228-250.
- Neely, C. J., Rapach, D. E., Tu, J., & Zhou, G. (2014). Forecasting the equity risk premium: the role of technical indicators. Management science, 60(7), 1772-1791.
- Novy-Marx, R. (2012). Is momentum really momentum?. Journal of Financial Economics, 103(3), 429-453.
- Novy-Marx, R. (2014). Predicting anomaly performance with politics, the weather, global warming, sunspots, and the stars. Journal of Financial Economics, 112(2), 137-146.
- Novy-Marx, R., & Velikov, M. (2022). Betting against betting against beta. Journal of Financial Economics, 143(1), 80-106.