

Graded Problem Set: "Portfolio Sorts" – Skill Level 2

Total Points: 100

Problem Statement

Your task is to construct and analyze sorted portfolios based on common risk metrics found in the literature. You obtain access to a dataset of prices and firm characteristics and code with blank spots, which you've already filled in for level 1. **For skill level 2**, you must **implement a bivariate sorting** scheme in the code yourself, you can choose between independent or dependent sorting. You also need to **implement code for constructing difference portfolios**. Choose freely what sort variables (X) you want to examine. The outcome variable (Y) is always the return; you do not need to concern yourself with Y. Finally, you should interpret and compare the results for the measures you've chosen, e.g. "stocks with high/low exposure to X on average realize positive/negative returns..." and think about the economic reasoning behind and the implications of these results. For more information on the topic, refer to the provided slides and the book "Empirical Asset Pricing the Cross Section of Stock Returns, Bali, Turan", chapter 5.

Evaluation Criteria

To achieve a perfect score, your submission must include:

1. **Monthly time-series of average outcome values** for the analyzed portfolios from 01.01.2005 until 01.01.2023 using at least either bivariate dependent or bivariate independent sorting (see code)
2. **A well-structured, in-depth written report** that is rigorous, clear, and intuitive. This should cover the data, methodology, results and interpretation; minimum one page of text, not including figures, tables, etc...
3. **A completed code file**, based on the incomplete one you were given, which contains at least one implementation of either bivariate dependent or bivariate independent sorting

The students are at liberty to decide and encouraged to experiment:

- What combinations of risk measures to use in the sorting algorithm
- What percentiles (i.e. how many portfolios) are used to sort for which sorting variable
- What kind of sorting (bivariate independent, bivariate dependent, univariate) is used
- What kind of weighting scheme is applied within each portfolio
- Students should justify their decisions and discuss differences in results in the report

Final Notes

- Ensure your report and presentation are **concise, well-organized, and professional**.
- Clearly justify all assumptions and methodological choices.