

EMPIRICAL FINANCE 3.2

– GROUP ASSIGNMENT 6 –

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General Instructions

Availability

Each week's coding assignment is available from Friday 00:00.

Deadline

The deadline to submit is the following week's Monday 23:59, no exceptions!

Tutorials

Each Friday at 13:30, the tutorial session is dedicated to the assignment. Justus will walk you through the assignment. You will receive useful coding tips. You can ask questions and get troubleshooting support.

Canvas Submission Requirements

Each group submission must include:

1. A PDF with written answers that includes: (a) a cover page with group number, member names and student ids, (b) answers to questions Q1 and Q2 below, and (c) an Appendix with the printed replication code.
2. A replication code file that is fully self-contained and allows to reproduce all results in R-Studio.

Important

If the assignment is not submitted by the deadline, you will receive 0 points.

If the replication code is not submitted by the deadline, you will receive 0 points.

If the code does not replicate the provided answers, the assignment will receive 0 points.

Clear cases of fraud will be reported to the exam commission.

Groups

You will work in groups of four. No extensions will be granted. Plan ahead and make it

work. Document your workload division via e-mail or Canvas group page to insure against slacking.

Weighting

Each assignment counts for 5% of the final grade (total of 30% across all six assignments).

Grading Each assignment can earn a maximum of 10 points (see grading rubric below) and the grade is equivalent to the points earned. Any questions about the grading must be asked within 48h of publishing the grade on Canvas.

Table 1: Grading Rubric

| | |
|-----------------------|---------|
| Q1(a) - Output | 1 point |
| Q1(a) - Analysis | 1 point |
| Q1(b) - Output | 1 point |
| Q1(b) - Analysis | 1 point |
| Q2(a) - Output | 1 point |
| Q2(a) - Analysis | 1 point |
| Q2(b) - Output | 1 point |
| Q2(b) - Analysis | 1 point |
| Layout and Writing | 1 point |
| Best Coding Practices | 1 point |

Preparations

Navigate to the excel file 'Group Assignment Stocks' and identify the **three stocks** associated with your group number. For your assigned stocks, independently obtain the stock tickers. For the indicated date range, import the stock prices using the tidyquant package. Load the stock prices into R and calculate the **simple returns** for the indicated years.

Comment: If a stock is not suited for the assignment, please independently select an appropriate replacement.

Questions

Q1. Mean-variance optimization

- (a) For the final 3 years of the sample, obtain optimal portfolio weights performing based on a mean-variance optimization. State and motivate your choice for all

inputs into the optimization. Plot the optimal portfolio weights and interpret shortly.

- (b) Identify and download an appropriate risk-free rate r_f and plot r_f . Motivate your choice. Compute the Sharpe ratio of the optimal portfolio from Question 1 (a) and interpret.

Q2. Value-at-Risk optimization

- (a) For the final 3 years of the sample, obtain optimal portfolio weights by directly minimizing the Value-at-Risk(0.05). State and motivate your choice for all inputs into the optimization. Plot the optimal portfolio weights and interpret shortly. How do they compare to the optimal weights obtained in Question 1 (a)?
- (b) For these optimal weights, compute the Violation ratio and Sharpe ratio. Show the ratios and interpret.