UNSW Sydney

SCHOOL OF RISK AND ACTUARIAL STUDIES

ACTL3182: ASSET-LIABILITY AND DERIVATIVE MODELS

TERM 3 2024 ASSIGNMENT

DUE DATE: 5th OF NOVEMBER 2024 11:59pm

1   The Assignment Task and Instructions

Portfolio Construction Project   [100 marks]

This assignment involves construction of two portfolios:

1. An index tracking portfolio that replicates the performance of the Financial Times Stock Exchange (FTSE) 100 Index which is a weighted index of United Kingdom's listed blue chip companies.

2. A speculative "capital growth" portfolio constructed from stocks listed on the London Stock Exchange[1] based on fundamental analysis.

Index Tracking Portfolio
The performance of the portfolio will be measured by the degree of dependence between movements in value of your index portfolio and movement in value of the FTSE 100 index. Your objective is to minimise the tracking error arising from the difference between the index and your portfolio values.

Capital Growth Portfolio
The speculative portfolio is to be formed with a view to maximising capital gains. The performance of this portfolio is measured by its excess growth in value over and above the growth of the FTSE 100 price index. This portfolio can be constructed using fundamental analysis.

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[1] https://www.londonstockexchange.com/

Construction of each of the portfolios is constrained by the following rules:

- The portfolio must be constructed using London Stock Exchange listed stocks.

- The portfolio must have at least 20 different shares.

- The portfolio cannot have more than 30 shares.

- The initial value of your portfolio is AUD50,000,000. You must make necessary conversions using exchange rate data which you can access from the Reserve Bank of Australia website[2].

- Short selling is prohibited.

- All funds must be invested in stocks (cannot hold cash).

You are expected to set up a visualisation tool for tracking the values of your portfolios on a daily basis. **Each portfolio begins its life on the 16th of September 2024 ending on the 18th of October 2024**. Closing price data can be extracted from various sources such as `https://au.finance.yahoo.com/`.

Prepare a report summarising your findings from this project. Your report should include the following:

1. The rational/technique behind your stock selection highlighting why you have included them in your portfolios. You may utilise publicly available information such as annual reports. You are required to cite where possible to mitigate plagiarism/ poor authorship.

2. The daily

   (a) value of your portfolios, and

   (b) growth in the dollar value of your portfolios.

3. The weights of each stock in your respective portfolios.

4. The continuously compounded percentage growth rate of the portfolios.

5. The daily continuously compounded returns and the corresponding per annum expected return and standard deviation of returns for each stock in your portfolios.

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[2]`https://www.rba.gov.au/`

6. The correlation between the selected stocks in each portfolio.

7. The mean and standard deviation of each portfolio' return compared with the mean and standard deviation of the FTSE 100 over the investment horizon.

8. The minimum variance set (MVS) for the index tracking portfolio. Which stocks are mean-variance efficient?

9. The weights of the minimum variance portfolio (MVP) for the index tracking portfolio.

10. The performance of each of the portfolios as measured against their stated aims and by applying appropriate performance measures.

11. For the capital growth portfolio, the report must also include

    (a) A brief history of each company.

    (b) An overview of the state of the economy, and its effect on the companies in question.

    (c) An analysis of the relevant industries.

    (d) For each company:
        i. Discuss their future prospects, growth, stability, market share, and risk.
        ii. Analyse financial data for each company such as; price-earnings ratio, price range, earnings per share, dividend per share, book value, leverage, dividend policy, estimated growth among other indicators.

 Other information relevant to the stock market may also be useful to maintain on a daily basis as it could be used in the project report.

2 Submission Requirements

You are expected to submit two files:

1. A PDF file summarising you key findings from your analyses of the two portfolios highlighted above. The page limit for this file is 5 pages excluding cover page and appendices (Times News Roman font, 12pt font size, 1.5 line spacing).

2. An Excel spreadsheet/ R markdown containing your analyses for the two portfolios. Marks will be awarded based on the presentation and clarity of your PDF file and your Excel spreadsheet/ R markdown as detailed in the assessment criteria below. Make sure that your responses in either the spreadsheet/ R markdown file are easy to follow.

3 Assignment Submission Procedure

Assignment reports must be submitted via the Moodle submission box which will be activated on the Course Website. Students are reminded of the risk that technical issues may delay or even prevent their submission (such as internet connection and/or computer breakdowns). Students may consider allowing enough time (at least 24 hours is recommended) between their submission and the due time.

Late Submission
The submission deadline is 11:59pm of the 5th of November 2024. Late submissions will be dealt with according to the school policy as detailed in the course outline.

4 Assessment Criteria

Your assignment report will be assessed using the following criteria:

1. Clear and concise justification of stock selection and summary of key findings in the PDF file. [25 marks]

2. Accurate presentation of results in excel or R. [50 marks]

3. Data visualisation in excel or R. [20 marks]

4. Follow the formatting and page limit requirements. [5 marks]