Do Firms Truly Outperform the Market? A Bayesian Perspective

Daniel Fu and Jack Wong

1. Introduction

- In this section, introduce the dataset you will work on for your final project.
- Discuss the scientific question you would like to address using statistical methods.
- Please Provide the references if applicable.
- Please include the R code your wrote in the Appendix. For example, we use R Markdown (Allaire et al. 2022) to prepare this document.

2. Exploratory Data Analysis

- In this session, please perform exploratory data analysis, e.g. histogram, scatterplot, time series plot, etc.
- Discuss the interesting patterns in the dataset that the exploratory data analysis shows, and how this reflects the statistical analysis you are going to do in the next session.

3. Frequentist Analysis

Perform the frequentist analysis in this session.

3.1 Proposed Frequentist Model(s)

In this section, formulate the frequentist model(s) you are going to use to analyze your dataset. Be sure to first define the notations involved in the model(s).

3.2 Fitting the Frequentist Model(s)

In this section, * discuss how you fit the proposed frequentist model(s). * report the results. * interpret the results in the context.

4. Bayesian Analysis

Propose the Bayesian analysis you will work on during the rest of the quarter in this session.

4.1 Proposed Bayesian Model(s)

In this section,

- formulate the Bayesian model(s) you are going to use to analyze your dataset. Be sure to first define the notations involved in the model(s).
- discuss how you will elicit the prior(s).

4.2 Fitting the Bayesian model(s)

- Propose how you will fit the proposed Bayesian models.
- Propose how you will perform sensitivity analysis of the Bayesian models, i.e., how the posterior distribution is affected by the prior
- Propose how you will check the MCMC convergence.

4.3 Prediction

In this section, propose how you can make predictions using the Bayesian model.

5. Discussion

In this section, discuss how you can improve your model.

6. Contributions

In this section, discuss the percentage of your contributions to the development final project proposal. Report the number of hours you have worked on the proposal, and the sections you are involved.

Please also discuss briefly the contributions of your teammate(s), as well as the help and support you got from your teammates(s).

References

Allaire, JJ, Yihui Xie, Jonathan McPherson, Javier Luraschi, Kevin Ushey, Aron Atkins, Hadley Wickham, Joe Cheng, Winston Chang, and Richard Iannone. 2022. *Rmarkdown: Dynamic Documents for r.*

Appendix

You can delegate detailed math derivations and/or sketch of algorithms and/or code in this section.