Risk & Asset Allocation
Spring Term Project

John A. Dodson

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1 Description

The project for the spring term of the Risk & Asset Allocation module is worth half of the module grade. It is a group project: each member of the group will receive the same score.

The goal of the project is to employ the techniques from the module to design an allocation of Dow Jones Industrial Average® (DJIA) component equity stocks (as of the implementation date) and (interest-free) cash and implement this allocation in an investment portfolio worth $10,000,000. The investment performance will be measured over the ten-week period from February 22 to May 2.

2 Teams & Roles

Teams shall consist of four to eight members. I am recommending, although not requiring, that your team appoint a member to each of four specific roles:

Portfolio Manager

The portfolio manager is responsible for organizing the team and communicating with me.

Investment Analyst

The investment analyst is responsible for developing the investment thesis, or view, that will be incorporated into the subjective characterization of the market.

Trader

The trader is responsible for all purchases and sales in the portfolio, including rebalancing trades if necessary.

Investment Accountant

The investment account is responsible for the portfolio's performance measurement.

3 Requirements

Investor Objective & Constraints

The investment objective will be profit over a two-month investment horizon. The manager is not allowed to borrow shares to generate short positions or to borrow cash to generate leverage. Nor is the manager allowed to use derivatives. Only re-balancing trades are allowed during the investment period.

Market Statistical Characterization

The market characterization is a complete description of the random market vector. You may assume that daily increments of asset values are independent lognormal random variables, but you may not ignore conditional heteroskedasticity or cross-sectional dependence. You may neglect the skewness of the market vector components only if you re-balance your portfolio at least weekly.

You may use the DJIA weights, or any source for market capitalization, and any model for the preferences of the representative agent to determine the prior consensus forecast for the expected return vector.

Investor Satisfaction Index

You may choose any of the satisfaction indexes that we have discussed to reflect your team's preferences.

Manager Subjective View

You must declare at least two proprietary views, which may be expressed in terms of a Dow component, a Dow sector, or the entire Dow index, and each view must include a confidence. I will not be assessing the merits of your views, but I will be assessing how you incorporate your views into the subjective characterization of the market.

Quantitative Methodology

You may use any of the robust optimization methodologies that we have discussed. Note that since you may not borrow stock or cash to implement your portfolio, the weights of feasible allocations are non-negative.

4 Trading & Accounting

Implementing Trades

The portfolio will be implemented based on the NYSE 3 PM close prices on Wednesday, February 22. Purchase quantities are natural numbers, and the total implementation cost must not exceed $10,000,000[1].

Re-Balancing Trades

You may submit re-balancing buy or sell trades, to be executed at NYSE close prices, during the term of the project. With the exception of cash, new weights must not differ from original weights by more than 1%.

Performance Measurement

Calculate the total mark-to-market and cash profit on your portfolio through the close of Wednesday, May 2[2]. The cash profit should include any dividends from shares acquired though trades before the dividend *ex* date[3].

Each $1,000,000 of profit will earn 2% extra credit on the project score. There will be no penalty for a loss, and the total project score will not exceed 100%.

5 Schedule for Submissions

The groups are to be formed by Wednesday, February 8.

10% of the project grade shall come from an **outline** due in the NetFiles dropbox at 5:30 PM on Wednesday, February 15. It may be in plaintext, Microsoft® Word, or Adobe® PDF. The outline should include a description of your index of satisfaction and your subjective views.

The project **write-up** is due in the NetFiles dropbox at 5:30 PM on Wednesday, February 29. It may be in Microsoft® Word or Adobe® PDF. Also, please provide copies of your scripts or code in a ZIP or TAR file and instructions on how to execute it to reproduce your results. A portion of your score will be based on whether I can execute your scripts on the versions of MATLAB, R, or Mathematica available on Vincent Hall terminals[4]. The write-up should include an introduction and a section for each of the required subsections above. Keeping in mind my policy on academic dishonesty, please remember to cite any external references, including professional investment research.

The **performance review** is due in the NetFiles dropbox at 5:30 PM on Wednesday, May 9.

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[1]You may ignore transaction costs.
[2]You may ignore transaction costs, management fees, and taxes.
[3]In previous versions of this, I misstated this.
[4]MATLAB 2010a, R 2.13, Mathematica 7.0