

Risk & Asset Allocation

Spring Term Project

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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 NASDAQ-100 (NDX) component equity stocks¹ (as of the implementation date), The Invesco PowerShares QQQ exchange-traded fund based on this index, and (interest-free) cash and implement this allocation in an investment portfolio worth \$10,000,000. The investment performance will be measured over the nine-week period from February 27 to May 1.

Teams & Roles

Teams shall consist of four to eight members. I recommend 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 re-balancing trades if necessary.

Investment Accountant

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

¹See <http://math.umn.edu/~dodso013/fm503/docs/NDX.csv>

1 Project Requirements

1.1 Investor Objective & Constraints

The performance objective will be profit over the nine-week investment horizon. The manager is allowed to borrow and sell shares to generate short positions² but gross leverage must be not exceed 200%³ upon implementation. The manager is not allowed to use derivatives. Only re-balancing trades are allowed during the investment period.

1.2 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 must address conditional heteroskedasticity and cross-sectional dependence in the data. You may neglect the skewness of the market vector components only if you re-balance your portfolio at least weekly.

You may use the index 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 of the market vector.

1.3 Investor Preferences

You may choose any of the satisfaction indexes consistent with the profit performance objective that we have discussed to reflect your team's preferences. Comment on the attributes of your choice and its consistency or inconsistency with relevant coherent principles. Explain and defend the choices you made on any parameter values.

1.4 Manager Subjective View

You must declare at least two proprietary views, which may be expressed in terms of a NDX component, a sector, or the entire 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.

1.5 Robustness of Quantitative Methodology

You may use any of the robust optimization methodologies that we have discussed to control for parameter estimation risk.

Trading & Accounting

Implementing Trades

The portfolio will be implemented based on the NASDAQ 3 PM CT close prices on Friday, February 27. Share quantities are natural numbers (ideally multiples of 100), and the total implementation cost must not exceed \$10,000,000⁴.

Re-Balancing Trades

You may submit re-balancing buy or sell trades, to be executed at NASDAQ 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%.

²The cash balance must fund any dividends for borrowed shares.

³That is, $\sum_i \alpha^{(i)} p_T^{(i)} \leq w_T$ and $\sum_i |\alpha^{(i)}| p_T^{(i)} \leq 2w_T$ where w_T is the initial net asset value, $p_T^{(i)}$ are the initial share prices, and $\alpha^{(i)}$ are the initial share quantities.

⁴You may ignore transaction costs.

Performance Measurement

Calculate the total mark-to-market⁵ and cash profit on your portfolio through the close of Friday, May 1. The cash profit should include any dividends from shares acquired through trades before dividend *ex* dates.

Each \$1,000,000 of profit will earn 5% extra credit on the project score. There will be no penalty for a loss, and the total project score with extra credit will not exceed 100%.

Submissions

Project Proposal

A project proposal, worth 10% of the project grade, is due on February 18. The proposal should include a description of your investment objective, your satisfaction index, and the views that will underpin your strategy, including specific measures for the performance of those views.

Trades

Your initial implementation trades are due in the NetFiles dropbox before 8:30 AM on Monday, March 2. Subsequent re-balancing trades are due before 8:30 AM on the trading day after they are implemented. Trades may be reported in Microsoft[®] Excel or text formats.

Project Report

The project write-up is due in the NetFiles dropbox at 5:30 PM on Wednesday, March 4. It must be in 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 initial allocation results.

The write-up should include an introduction and a section for each of the required subsections above. Keeping in mind the policy on academic dishonesty, please remember to cite any external references, including professional investment research.

Performance Review

The performance review is due in the dropbox at 5:30 PM on Wednesday, May 6. It should include an accounting of the profit from your investment strategy, performance measurements related to your particular views, and an explanation for how the views contributed to the overall performance.

⁵You may ignore transaction costs, management fees, and taxes.