Course Project (Draft of Feb 25, 2024)

553.647: Quantitative Portfolio Theory and Performance Analysis

This course covers a multitude of ideas and approaches to the management of asset portfolios – from understanding the investment management mandate, to defining and implementing strategies, selecting benchmarks and measuring performance. Many of these have been introduced and developed separately. This project gives students the opportunity to perform an end-to-end exercise which makes use of these ideas and approaches. Because students may have differing backgrounds and interests, completion of the project affords the flexibility to develop a case scenario for the project that lines up with those interests. However, recognizing that complete flexibility can leave the student at a loss as to where to start, I'll give a baseline-default that can be further developed by each student group or to merely give an idea of what I am looking for as a project from which student-groups can depart to pursue their own interests.

Overview

This project is to be delivered (submitted) as if you (your team acting as an investment management company) are making a response to an investor request for proposal (RFP). You get to specify the details of the RFP to which you are responding. Then you will develop an investment strategy for meeting the requirements of the RFP. Perhaps, you would use one that was covered in the course, though certainly not essential – there are many sources of ideas in this regard and I give some of these in Canvas. A key and important element of the project is the back-testing the implementation of your strategy against historical data and making comments about how you meet (or exceed) the needs of the investor as specified in the RFP.

Getting Started

To get started, focus on the RFP. Do you want to concentrate on a particular product area (stocks vs. bonds, or provide for a multi-asset need of stocks, bonds, commodities, etc.)? Usually, the RFP will identify an investment objective (total return, minimized tracking error, etc.) and/or a benchmark (S&P 500, Barclay's Aggregate Index, or a particular liability profile) – so you will need to identify that. Remember, this is an academic exercise, so keep the RFP focused, straight-forward, and achievable in a reasonable amount of time.

One aspect that should be addressed is how your strategy and implementation compare to "classical" modern portfolio theory as presented in the course. One element of this could be to compare your outcome with a rudimentary implementation of the "fast algorithm" covered in the course or a classical 60%/40% stock-bond strategy. This, in addition to a benchmark you may have selected. This element should be included in the RFP's specification for back-testing.

It is never too soon to consider the data you will use. I have provided some ETF data (S&P 500 (SPY), the first level sub-aggregate SPX ETFs, and other bond & asset ETF's), for the period since 1999, in the Course Project Folder in Canvas. Use this data for your project. Data is key to back-testing results and measuring the associated performance.

I will post certain "ground rules" and specifics separately in Canvas.

I am happy to interact with you (email or office hours, etc.) to facilitate "Getting Started".

Objectives

After completion of this project, you will be able to:

- Know what it takes, in a limited way, to construct and implement a quantitative investment strategy in response to an RFP
- Back-test the strategy and assess its performance (return and risk) against the investment objective and/or RFP specified benchmark.
- Develop an investor presentation to sell your idea and your company

Grouping

Groups, representing competing investment managers, will ideally consist of no more than 5-6 students. If groups of students wish to become a team, self-identify to the instructor. Otherwise, the instructor will form teams by some random algorithm using the course roster.

Submission

There are two submissions for the project. The first is the RFP (referenced previously) along with a brief summary of the groups approach. This should be on the order of one-two pages; the approach should include data specification, need and accessibility. This should be submitted during the week of March 11, 2024.

The second submission is the final for the course project and should include a presentation (to the investor-issuer of the RFP) and a “leave behind” to include a copy of the slides and any other material the group thinks the investor might require to make a selection. This will be due during the week of April 20. Presentations will be scheduled subsequently.

Required Components

- Clear description of investment strategy; asset class(es)/assets; and benchmark. Also, include the source of the investment strategy you use.
- Back-testing Results: Performance/risk measures as compared to a benchmark and the “fast algorithm”. This is a good place to compare to the 60-40 task.
- Graphical Presentation of back-tested performance to include a histogram of one-year trailing returns, advanced one month at a time; plus, any other representations thought to be interesting.
- Describe data sources and any issues confronted with the data.

Plagiarism

Plagiarism is defined as taking the words, ideas or thoughts of another and representing them as one's own. If you use the ideas of another, provide a complete citation in the source work; if you use the words of another, present the words in the correct quotation notation (indentation or enclosed in quotation marks, as appropriate) and include a complete citation to the source. See the course text for examples.

Deliverables & Project Components

Deliverable	Description	Components
Request for Proposal (RFP) and Summary of Proposed Response	The RFP describes the investor solicitation The Summary of Proposed Response describes the effort to be undertaken by the Group	• RFP: Investor Need and Objective; benchmark (as required) • Summary: Investment approach; data needs; strategy/tactics; back-testing plan
Presentation	The Presentation should be on the order of 15 minutes, or so: this is your chance to sell your services, cover what you think appropriate	• PowerPoint Presentation (PDF); and any other "leave-behind" material that you think the investor might find useful to select your firm for the mandate.

Grading Rubric

RFP				
	Poor	Fair	Good	Exceptional
Content (80%)	Failure to perform the required submission	Major Gaps in reasoning or in establishing requirements	Addresses all required components	Meets all requirements, but provides an exceptional additional insight
Organization & Structure (20%)	Poor Organization & Structure	Fair Organization & Structure	Good Organization & Structure	Exceptional Organization & Structure
Presentation				
	Poor	Fair	Good	Exceptional
Content (80%)	Fails to Adequately respond to RFP	Responds to RFP, but leaves doubt about firm's capability to perform	Satisfactory response to RFP	Compelling response to RFP with exceptional supporting information
Delivery (20%)	Delivery unintelligible; Presentation inadequately executed in allotted time (15m)	Delivery is intelligible, but some promised component is missing	Satisfactory delivery with appropriate supporting material	Excellent delivery with compelling and concise supporting material