PORTFOLIO MANAGEMENT

FINC-GB.3332.30
Spring 2017
R 6.00-9.00pm
T-UC15

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Course Description

There has been a proliferation of new products and investment strategies in the asset management space in recent years, such as smart beta, alternative beta, fundamental indexing, low volatility, and leveraged and inverse ETFs. This course applies portfolio theory to understand and evaluate these products and strategies in the context of the empirical evidence about return patterns across assets (i.e., the factors such as value/growth, momentum, and carry that drive returns) in multiple markets/asset classes (e.g., US and international equities and bonds, currencies, and commodities).

Key questions include:

- What factors drive asset returns? What are the economic drivers: Is it risk or mispricing?
- How can the facts about returns be used to build investment strategies and products?
- How should we evaluate the performance of existing products or new strategy ideas given the empirical evidence?

The course starts from the basic theoretical framework as developed in Foundations of Finance, but covers much of the recent research on quantitative investment strategies. As many modern investment strategies use big data on securities prices, company fundamentals, et cetera, the course will use a platform called Quantopian (www.Quantopian.com) to learn how to develop, analyze, and back-test new strategies and products in a realistic real-world environment. The final project requires you to develop, analyze, and pitch a new investment strategy using Quantopian.[1]

[1] Quantopian now has the support from Point72 and one can submit investment strategies to be evaluated and, once successful, receive seed funding.

Although Quantopian uses Python to build and analyze investment strategies, no prior knowledge of Python is required for the course. As part of the course, we will discuss modern data analytics tools and some basic Python programming. I will provide templates for some of the key strategies that will help you to develop and critically analyze your own investment ideas. For asset classes beyond equities, we will analyze real-world data using Excel.

The course also covers the institutional landscape of the asset management business—the firms (e.g., Blackrock, Vanguard), the vehicles (e.g., mutual funds, ETFs, hedge funds), and the trends (e.g., active vs. passive, fee competition, fintech competition such as Quantopian).

Pre-Requisites

Foundations of Finance (COR1-GB.2311) is the pre-requisite for this course. Students are expected to understand statistics, basic portfolio theory, including the idea of mean-variance optimization, and the CAPM.

Required and Recommended Materials

There is no required textbook for the course, but there are several books that cover some of the material and also provide additional information. One such resource is

> Edwin J. Elton, Martin J. Gruber, Stephen J. Brown, William N. Goetzmann, **Modern Portfolio Theory and Investment Analysis**, Wiley, 9th Edition, 2014.

which will be made available in the bookstore as an e-textbook. Basic portfolio theory and some of the more advanced material is also covered in the textbook that is required for the Foundations of Finance course

> Zvi Bodie, Alex Kane and Alan J. Marcus, **Essentials of Investments**, McGraw-Hill Irwin, 10th edition, 2017.

Note that earlier editions of the same book provide essentially equivalent coverage of the material. You might also want to take a look at

> Andrew Ang, **Asset Management: A Systematic Approach to Factor Investing**, Oxford University Press, 2014.

> Antti Ilmanen, **Expected Returns: An Investor's Guide to Harvesting Market Rewards**, Wiley, 2011.

These books are excellent resources that cover a number of the topics that we will be discussing during the course.

There are 2 required cases that are available in the bookstore in the form of an electronic course pack:

> Innovating into Active ETFs: Factor Funds Capital Management LLC, 9-211-031, Harvard Business School Publishing
>
> ProShares Hedge Replication ETF, UV6939, Darden Business Publishing

There will also be lecture notes, handouts (e.g., journal and news articles), and supplementary materials (e.g., Quantopian templates for investment strategies) for many classes. Lecture notes and handouts will be distributed at the beginning of class, and they will also be available on NYU Classes before the relevant class session. Extra copies of these materials will ***not*** be available in my office. If you miss or lose the handouts, you should print them out from NYU Classes. The supplementary materials will also be available on NYU Classes, as will links to other relevant information.

Course Requirements

Assignments:

The assignments for the course will consist of 4 problem sets, 2 cases, 2 in-class quizzes and a final project. There will be NO final exam. Problem set questions will be handed out in class (and will be available on NYU Classes). Each student should submit an individual set of solutions electronically via NYU Classes. However, you may discuss the problem sets with other students. Case questions will also be handed out in class, and the same rules apply.

The 2 quizzes will consist of multiple choice and fill-in-the-blank questions and short problems like those on the problem sets, in the recommended textbooks, and in the lecture notes. They will be closed book; however, you may bring in a limited number of pages of notes. In addition, I will provide a formula sheet with all the relevant formulas. There will be no make-up exams. If you know that you will be unable to make it to class on the scheduled dates, let me know far enough ahead of time so that you can take the quiz beforehand.

The final project will be an effort to apply the concepts of the class to propose an investment strategy and to analyze it with the tools developed in class. Projects will be done in groups of up to 4 students. The project presentation will be in the last day of class. Further details will be provided later in the semester.

Other requirements:

Class attendance is an important part of the learning experience. I do not take formal attendance; however, keep in mind that class participation does account for 5% of the final grade. If you are not in class, you cannot participate in the discussion. If you will miss class, please inform me beforehand via email. For those of you who may miss class, I will attempt to tape every class session. The URL for the streaming video will be posted on NYU Classes as soon as it becomes available. However, keep in mind that viewing the video is not a good substitute for attending class.

Finally, participation is an essential part of learning in this course. Students are expected to participate in all facets of classroom learning. In particular, you are expected to contribute, in a constructive manner, to classroom discussions, including those of the assigned cases. These contributions will determine your class participation grade. The assigned reading should be done before the corresponding class session, and you are also expected to keep up with current business news by reading a publication such as the *Wall Street Journal*, the *Financial Times*, and the *Economist*. I will attempt to alert you to particularly interesting news items via an announcement on NYU Classes. Thus, you should make an effort to check the course page regularly.

Policies and Procedures

The problem sets should be submitted before the end of the class session in which they are due. The associated Excel files should be submitted via NYU Classes. Assignments that are late but within 24 hours of the deadline, will receive ½ credit. After 24 hours, no assignments will be accepted (unless due to documented serious illness or family emergency); it is unfair to the other students in the class.

I will make every effort to start and end class on time. If you arrive late, please enter quietly without disturbing the rest of the class. While in class, please be courteous to your fellow classmates and me. During lectures and discussions only one person should speak at a time. I encourage you to ask questions of your fellow students and me. I consider a good question as valuable as a good answer. In lectures, it is difficult to ask good questions unless you already have some familiarity with the material. Therefore, you should do the required reading before the relevant class session. Laptops, cell phones, Smartphones and other electronic devices are a disturbance to both students and professors. All electronic devices must be turned off prior to the start of each class meeting, unless laptops are required for parts of the class.

Academic Integrity

Students are expected to adhere to the NYU Stern Code of Conduct. A student's responsibilities include, but are not limited to, the following:

- A duty to acknowledge the work and efforts of others when submitting work as one's own. Ideas, data, direct quotations, paraphrasing, creative expression, or any other incorporation of the work of others must be clearly referenced.
- A duty to exercise the utmost integrity when preparing for and completing examinations, including an obligation to report any observed violations.

Students with Disabilities

If you have a qualified disability and will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Students with Disabilities (CSD, 998-4980, www.nyu.edu/csd) verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the CSD, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation.

Grading Policy

The final grade will be calculated as follows:

Class participation	5%
Problem sets	20%
Cases	10%
Quizzes	50%
Final project	15%

At NYU Stern, we strive to create courses that challenge students intellectually and that meet the Stern standards of academic excellence. The Finance Department has elected to adopt a set of grading guidelines that can be found at
http://www.stern.nyu.edu/experience-stern/about/departments-centers-initiatives/academic-departments/finance/academic-programs/mba-overview/grading-standards
Specifically, for this course and all other elective courses, these guidelines indicate that instructors should award grades of "A" or "A-" to approximately 35% of students.

Course Outline

The problem sets and cases are listed in the session when they are due (see the last page for dates). Readings should be done prior to the class session in which the material is discussed. Any changes to this schedule will be announced in class and on NYU Classes. EGBG refers to Elton, Gruber, Brown & Goetzmann, **Modern Portfolio Theory and Investment Analysis**; Ang refers to Ang, **Asset Management**.

Session	Date	Topics	Assignments and background reading
1	February 9	Introduction Review of traditional portfolio theory, the CAPM, and empirical challenges	EGBG: Chaps. 4-6, 13 Ang: Chaps. 3, 10
2	February 16	U.S. Equity Factors I Size and value Introduction Quantopian	Problem Set #1 EGBG: Chaps. 8, 16 Ang: Chaps. 6, 7
3	February 23	U.S. Equity Factors II Momentum Building a momentum strategy in Quantopian	Problem Set #2 EGBG: Chap. 16 Ang: Chap. 7
4	March 2	U.S. Equity Factors III Short-selling, trading costs, and liquidity	Ang: Chap. 7
5	March 9	Quiz #1 U.S. Equity Factors IV Other factors Smart beta and fundamental indexing Levered and inverse products	Quiz #1 EGBG: Chap. 10 Ang: Chap. 7
6	March 16	**NO CLASS**	
7	March 23	The Asset Management Landscape I Mutual fund and ETFs Performance measurement using multi-factor models	Problem Set #3 EGBG: Chap. 25 Ang: Chaps. 14-16
8	March 30	The Asset Management Landscape II Fees, performance, flows Hedge funds	Ang: Chaps. 17, 18
9	April 6	Case: Innovating into Active ETFs International Equities International diversification Global equity factors Currency effects and factors	Case questions EGBG: Chap. 12

10	April 13	Fixed Income The yield curve Treasury return factors High yield bonds Bonds and stocks	Problem Set #4 EGBG: Chap. 21, 22 Ang: Chap. 9
11	April 20	Quiz #2 Alternative Assets Liquid alternatives Commodities Hedge funds	Quiz #2 Study Ang: Chaps. 17 & 18
12	April 27	Case: ProShares Hedge Fund Replication ETF Recent innovations in factor investing	Case questions Ang: Chap. 11
13	May 4	Presentations final project	

Assignment Due Dates

Assignments (problem sets, cases, quizzes) are due on the following dates. Problem sets and cases are due before the end of the corresponding class session. Assignments that are late, but within 24 hours of the deadline, will receive ½ credit. After 24 hours no assignments will be accepted (unless due to documented serious illness or family emergency). There will be no make-up exams. Any changes to this schedule will be announced in class and on NYU Classes.

Assignment	Due Date
Problem Set #1	February 16
Problem Set #2	February 23
Quiz #1	March 9
Problem Set #3	March 23
Case: Innovating into Active ETFs	April 6
Problem Set #4	April 13
Quiz #2	April 20
Case: ProShares Hedge Fund Replication ETF	April 27
Final project	May 4