Some Background Information

Recent advances in information technologies enable us to obtain a wealth of investment-related information from numerous websites and other media. For example,

The breadth and quality of information on Yahoo! Finance, Google Finance, etc. have improved tremendously in recent years. They allow us to find a variety of relevant information and data free of charge.

We can easily find and enjoy listening to what investment gurus have to say about the current investment conditions and their investment recommendations.

Online brokers and money management sites allow us to employ useful portfolio management tools that were available only to professional investment advisors until recently.


We also have access to many excellent materials posted by faculty members of other institutions. For example, Professor Aswath Damodaran’s (NYU) website posts a phenomenal set of teaching materials and data. The data library of Professor Ken French (Dartmouth) is extremely useful for anybody who wants to study stock markets seriously (including academic researchers and hedge fund managers). CFA institutes, Morningstar, etc. also provide helpful educational materials on their websites.

With these advances in information environments, conventional MBA investment curriculum (typically consisting of a textbook and a few cases/simulations) will become less and less likely to provide incremental knowledge/skills beyond what students can learn by themselves.

More seriously, having worked with several investment managers, I have recognized that there exists a large discrepancy between what are taught in conventional MBA investment courses and what are required in the practice of professional investment management.

With this recognition, I have employed a non-conventional course format that aims to develop “hands-on” analytical skills and to promote “evidence based” discussions. Students will find the course very challenging but very practically relevant and useful.
Course Format and Learning Objectives

We can view this course (section) as a sequence of training sessions for newly hired research analysts at a professional equity portfolio management team. The team seeks to develop a sensible portfolio management process for its clients to “beat the market” (the precise meaning of which will become clear in the course). The team implements two types of portfolio strategies: the “Core” and the “Satellites.”

- The Core portfolio pursues a practical application of the modern portfolio theory. Students will learn the basic framework and fundamental methodology of professional (process-driven) portfolio management. Students will also learn various implementation issues we face when we take the theory to the practice of portfolio management.

- The Satellite portfolios explore various active investment strategies. Students form groups of 2 or 3 to conduct research on stock selection strategies. Students will have opportunities to present their research during the last week of the semester.

However, it is generally very difficult, if not impossible, to beat the market because the stock market has already incorporated much more information than we have. The markets are constantly reaching greater levels of efficiency by aggregating more information.

To gain an edge over the competitors, the team seeks sensible (theoretically sound and empirically valid) investment ideas that have slightly favorable odds to outsmart the market. Then, how should we design a portfolio strategy to take advantage of the slightly favorable odds? How much optimization would be actually optimal when we have to rely on low signal-to-noise information in a high noise environment? These are among the important practical issues we would like to discuss in the course.

Along the way, students will learn various elements of a portfolio management process, such as data collection, risk-return analysis, portfolio optimization, performance measurement, and so on. Several Excel assignments will provide students with hands-on experience in applying the concepts and tinkering with the models. The course’s learning outcomes are:

1. After working diligently in this course, students will be comfortable in taking important portfolio management concepts to real world data so as to develop “evidence-based” insights and investment recommendations for your organizations or/and your clients.

2. After the successful completion of FINA 762, students will be ready to make positive contributions to “Student-Managed Investments” (FINA 772) that manage the actual money provided by the Business Partnership Foundation (BPF) of the Moore School.

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1 We mainly focus on equity portfolio management. I encourage students to take ACCT738 (Financial Statement Analysis), FINA737 (Derivative Securities), and FINA770 (Fixed Income Securities) to complement this course.

2 Even the most skillful and successful investors can make a correct buy-or-sell call only 55-60% of the time. “Hit ratios” of others must be much lower. Beware of pundits who make “confident-sounding” stock pitches (= cow droppings). “Uncertainty is a better indicator of accuracy than confidence is.” (The Signal and Noise by Nate Silver.)

3 FINA 772 will take your knowledge and skills in investment management to the next level: Generating ideas to improve portfolio management and evaluating the ideas to improve the quality of investment decisions.
Prerequisites

- Mastery of an introductory graduate-level finance course is essential. Alternatively, a successful completion of an undergraduate advanced elective course in investments (e.g. FINA469) or a completion of the CFA Level I exam (or equivalent) is necessary to do well in this course.
  - You should be very familiar with dividend discount models, mean-variance analysis, and the Capital Asset Pricing Model (CAPM).
- The course (especially this section) will be more quantitative and analytical than most other MBA courses. Basic knowledge of statistics (e.g., mean, variance, covariance, correlation, regression, etc.), basic calculus (e.g., derivatives, logarithms, exponentials, etc.), and some matrix operations (inner product, outer product, transpose, inverse, etc.) are essential.
  - We will use vectors and matrices (array functions) heavily on Excel. You should not have allergic reactions to vectors and matrices. Note that we use them to simplify complicated expressions, not the other way.
  - Make sure that you can run SOLVER on your Excel, unless you can use other software tools to solve constrained optimization problems. 

Course Materials

- Course materials (including lecture notes, assignments, papers, book chapters, slides, spreadsheets, etc.) are posted on the course folder in the cloud.
- No particular textbooks are required for this course. I will borrow a few materials (e.g. tables, charts, etc.) from the textbooks by Stewart, Piros, and Heisler (Running Money: Professional Portfolio Management, McGraw-Hill) and Bodie, Kane, and Marcus (Investments, McGraw-Hill).
- Please see the Course On-Boarding Manual for details.

Course Grading

- 40% on an individual take-home final examination (or an oral examination if you prefer) at the end of the course. The final exam will focus on practical applications.
- 20% on a midterm examination. The midterm exam will focus on the knowledge and understanding of concepts. (More conventional, CFA curriculum-like materials).
- 20% on a Research Project (a Written Research Report).
- 20% on Asynchronous Assignments and Course Participation (e.g. regular submissions of individual assignments, in-class and/or online participations, contribution to the course materials, etc.)

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4 Several Mac users used Virtual Machines to run Windows version of Excel. Unfortunately, I do not have experience with Mac.
Work Environment

Any disturbance to our work environment will not be tolerated. All cell phones must be turned off in class. If you must be late, take your seat quietly. Do not leave the classroom without the instructor’s prior consent, except in the case of emergency.

The use of computers, tablets, smartphones, or other electronic devices in class is permitted only for the purposes of class discussions and note taking. Checking emails, engaging in online chats, reading materials/websites that are unrelated to class discussion, working on assignments for other courses, etc. during class meetings are serious offenses and will be treated with extreme prejudice (with an “F” grade).

Academic Integrity

It is the responsibility of every student at the University of South Carolina Columbia to adhere steadfastly to truthfulness and to avoid dishonesty, fraud, or deceit of any type in connection with any academic program. Any student who violates this Honor Code or who knowingly assists another to violate this Honor Code shall be subject to discipline. The Honor Code is attached below. For more information about the academic integrity issues, go to the following website: www.sc.edu/academicintegrity

University of South Carolina Honor Code:

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1. Giving or receiving unauthorized assistance, or attempting to give or receive such assistance, in connection with the performance of any academic work.
2. Unauthorized use of materials or information of any type or the unauthorized use of any electronic or mechanical device in connection with the completion of any academic work.
3. Access to the contents of any test or examination or the purchase, sale, or theft of any test or examination prior to its administration.
4. Use of another person’s work or ideas without proper acknowledgment of source.
5. Intentional misrepresentation by word or action of any situation of fact, or intentional omission of material fact, so as to mislead any person in connection with any academic work (including, without limitation, the scheduling, completion, performance, or submission of any such work).
6. Offering or giving any favor or thing of value for the purpose of influencing improperly a grade or other evaluation of a student in an academic program.
7. Conduct intended to interfere with an instructor’s ability to evaluate accurately a student’s competency or performance in an academic program.

Whenever a student is uncertain as to whether conduct would violate this Honor Code, it is the responsibility of the student to seek clarification from the appropriate faculty member or instructor of record prior to engaging in such conduct.
FINA762: Course Outline

1. Course Introduction
   a. Syllabus
   b. Efficient Market Hypothesis and The Science of Investing
   c. Course Roadmap
   d. Fama-French Data Analysis: An Introduction to Factor Investing
      i. Size and Value
      ii. Size and Momentum Effects
      iii. Size and Investments
      iv. Size and Operating Profitability

2. Excel/Math Bootcamp
   a. Issues in Measuring and Interpreting Returns
      i. Simple Returns vs Log Returns
      ii. Ex Post Mean Returns vs Ex Ante Mean Returns
   b. Downloading and Analyzing Historical Returns
      i. Risk and Return Metrics
      ii. Correlations
      iii. Portfolio Performance Measures
   c. Excel Array Functions
      i. Basic Rules of Matrix Operations
      ii. Covariance Matrix Calculation
      iii. Portfolio Risk Calculation
   d. Regressions
      i. Single Factor Model
      ii. Multi-Factor Model
   e. VBA Functions

3. Asset Allocation
   a. Minimum Variance Frontier & Useful Excel Tools/Tricks
      i. Covariance Matrix as Important Inputs
      ii. Ex Post Global Minimum Variance Portfolio
      iii. Ex Post Tangency Portfolio
      iv. Separation Property and the Full Investment Constraint
      v. Minimum Variance Frontier Portfolios
      vi. Constrained Portfolio Optimizations with Solver
   b. The Virtue and Pitfalls of Portfolio Optimization
      i. Out-of-Sample Evaluation
      ii. Pitfalls of Portfolio Optimization
      iii. The Virtue of Portfolio Optimization
   c. Portfolio Risk Decomposition
      i. Marginal Risk Contribution
      ii. Total Risk Contribution
      iii. Risk Budgeting
      iv. Diversification Ratio
d. Risk-Based “Strategic Beta” Strategies
   i. GMVP with and without Long-only Constraints
   ii. Maximum Diversification Portfolios
   iii. Risk Parity Portfolios
   iv. Bootstrapping (Resampling) Simulation Methods

   a. Risk and Return
   b. Risk Analytics and Portfolio Theory
   c. CAPM and APT

5. Factor Investing
   a. Efficient Markets Today + Five Principles to Hold Onto
      i. Joint Hypothesis Problem
      ii. Style/Factor choice is the main, hard, and only portfolio problem now.
      iii. The Importance of Separating Active Shares from the Benchmark
   b. Fama-French Factor Models
      i. Mkt-Rf, SMB, HML, CMA, RMW and Momentum Factors
      ii. Applications to Performance Analysis
   c. Beyond Fama-French Factor Models
      i. Volatility, Accruals, Equity Issuance, etc.
      ii. “Buffett’s Alpha”
   d. Value Strategies
      i. Sensibility and Caveats
      ii. Generalization: Various valuation models (DDMs, FCF-based and Residual Income-based Models)
      iii. Country Selection Example
      iv. Piotroski’s Value Strategy
      v. Fundamental Indexing

6. Evaluating Portfolio Fund Evaluation Projects
   a. The “Importance” of Asset Allocation
      i. Brinson, Hood, and Beebower (1986)
   b. Applying Risk Decomposition/Attribution Analyses
      i. Implied Return Forecasts
      ii. Implied Risk Budgets
   c. Evaluating Fund Performance with Fama-French Factor Models
      i. Alpha
      ii. Information Ratio

7. The Fundamental Law of Active Management
   i. Information Coefficient (IC) and Breadth
   ii. Implementation Efficiency (Transfer Coefficients)

8. Research Project Presentations