UNIVERSITY OF PENNSYLVANIA
The Wharton School

FNCE 205 / 720 Investment Management

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Overview

The course studies the concepts and evidence relevant to the management of investment portfolios. Topics include diversification, asset allocation, portfolio optimization, factor models, the relation between risk and return, mutual funds, performance evaluation, trading, passive (e.g., index funds) and active (e.g., hedge funds, long-short strategies) investment strategies, long-horizon investing and simulation.

The primary emphasis of the course is on the design of common stock portfolios, although additional asset classes such as bonds and alternatives (e.g., hedge funds, real estate) are covered in some depth.

Important: This course does not address the details of individual security valuation and selection (i.e., "equity research" or "stock picking"). Also, the course *does not* cover private equity and venture capital, which are covered in FNCE251/751 and FNCE 250/750 respectively.

The course is applied in an important sense, in that various concepts and approaches are subjected to real-world data. However, the course does not devote much time to the institutional aspects of investment management. Rather than describe the institutional details of current practice, the course attempts to provide a lasting conceptual framework in which to view risk and the investment process, and to analyze future ideas and changes in the investment environment.

The **prerequisites** for MBA students are FNCE 611 or 612 and Stat 613 or 621. The prerequisites for undergraduates are FNCE 100 and Stat 101–102. (Stat 102 may be taken concurrently with this course). Given that investment management requires one to analyze and deal effectively with uncertainty, *a good grounding in statistics is essential*, and familiarity with statistics should extend through covariance, correlation, and multiple regression.

Required Course Materials

> (1) Z. Bodie, A. Kane and A. J. Marcus, *Investments* 11th ed. (McGraw-Hill/Irwin, 2018).
> (2) Additional readings and lecture notes that will be available on Canvas.

The Bodie-Kane-Marcus book will be available for purchase at the Penn Bookstore, and several copies will be on reserve at Lippincott Library.

A Solution Manual for the BKM end-of-chapter problems will be available at the bookstore, and several copies will be available at Lippincott.

Although not required, a useful supplementary text is:
> Lasse Pedersen, *Efficiently Inefficient*, (Princeton University Press, 2015)
I will provide selected readings and exercises from Pedersen on the course Canvas site.

Downloadable exercises for Pedersen are at http://docs.lhpedersen.com/EfficientlyInefficient_Exercises.pdf. (Solutions as well as the supplementary exercise materials will be available on the course Canvas site.)

Evaluation

There will be two exams (**Thursday, Oct. 3 and Tuesday Nov. 26,** *both held during regular class time*), each contributing 35% to your grade. Both exams will be closed book, but you may bring to each exam an 8½ by 11 sheet of paper containing formulas. The remaining 30% of the grade will be based on performance on five or six computer assignments. In addition, (optional) problem sets will be assigned periodically during the semester.

PLEASE NOTE: If an emergency or illness should force you to miss an examination, **you must contact me before the exam**.

Computer Projects

The projects are intended to give students some hands-on familiarity with investment data and to provide experience in applying quantitative techniques useful in investment analysis. The projects will require computations that can be performed on a laptop. Most of the files that will be used are data-oriented, and are easily analyzed in Excel.

Students may work on these projects individually or in teams of **no more than four** members. Team sign up is via Canvas. If working in a team, only one project report should be submitted per team, and all members of the team will receive the same grade. Reports will be submitted via Canvas, and the names of all team members should appear clearly *on the front page of the report*. The project report should be a self-contained summary of the project's results and should be limited to three pages, although additional exhibits may be included as necessary. Grades will be assigned as "check-plus," "check," "check-minus," or "no-credit." Due dates will be announced when the instructions for each project are distributed, generally two weeks before the due date.

Teaching Assistants

Maria Gelrud (mgelrud@wharton.upenn.edu; TBD SH-DH) and Max Miller (maxmil@wharton.upenn.edu; TBD SH-DH), Wharton Ph.D. students in finance, are the primary teaching assistants for the course. They will hold weekly office hours, assist in the grading of exams and projects, and conduct review sessions. There will be two additional TAs assisting Maria and Max. Office hours for all TAs will be posted on Canvas.

Class Handouts

Copies of all readings, class notes, problem sets, computer projects, and other class materials will be available on Canvas.

Office Hours

My office hours are on Tuesday from 2:30 to 4:30. You may also see me before or after class to make an appointment for another time. Office hours for TAs will be posted on the course Canvas site.

Course Outline and Reading List (*<u>SUBJECT TO CHANGE</u>*)

CN – Class Notes (available on Canvas)
BKM - Bodie, Kane and Marcus, **11th ed.**
Readings – Additional readings on Canvas

<u>Approx.
Session #</u>

1   **I. Introduction and Course Overview**

           A. Returns and Risk; Some Basic Statistics

        CN-1, "Statistics Review"
        CN-2, "Returns and Risk"
          BKM: Ch. 1 (Overview; includes a good summary of 2008 financial crisis)
          BKM: Ch. 2, pp. 40-50 (stocks; indexes)
          BKM: Ch. 3, pp. 57-62 (how securities are issued)
          BKM: Ch. 5, pp. 117-147 (interest rates, risky asset returns, historical evidence);
               Problems 7,9,10,12
          BKM: Ch. 7, pp. 237-244 (some basic statistics)

2   **II. Mutual Funds and ETFs**

        CN-2A, "Investment Companies"
         BKM, Ch. 4

3-5   **II. Diversification; Choosing Optimal Portfolios; Asset Allocation Implementation**

        CN-3, "Diversification"
          BKM: Ch. 7, pp. 193-195, 214-216 (diversification);
               CFA Problems 1-3
        CN-4, "Optimal Portfolio Choice"
          BKM: Ch. 6, pp. 166-178 (combining a risk–free & a risky asset);
               Problems 13-19
          BKM: Ch. 7, pp. 195-214 (portfolios of 2 risky assets);
               Problems 4-19, CFA Problems 8-10
        CN-5, "Asset Allocation – Implementation"
          BKM: Ch. 6, pp. 158-164 (risk aversion and indifference curves)

6-7   **III. Estimating Risk**: **Factor Models and Beta Estimation**

        CN-6, "Factor Models and Beta Estimation"
          BKM: Ch. 8 (all but pp. 262-271) (Factor Models);
               Problems 5-16; CFA Problem 1

          IV. Estimating Expected Returns: Asset Pricing Models

8   **A. Asset Pricing Models – CAPM and APT**

        CN-7, "Asset Pricing Models – Expected Returns are determined by Risks"
          BKM: Ch. 9 (all but pp. 290-298) (CAPM);
               Problems 1-3, 8-21, 23; CFA Problems 11-12
          BKM: Ch. 10, pp. 310-320, 321-323 (APT);
               Problems 5-9
          BKM: Ch. 13, pp. 406-407 (Chen, Roll and Ross; macro factors)

9-10   **B. Identifying Additional Risk Factors / Factor Model Applications**

> *CN-8*, "Cross Section of Stock Returns"
>> *BKM*: Ch. 9, pp. 294-298 (liquidity factor)
>> *BKM*: Ch. 10, pp. 324-325 (Fama-French 3-factor model)
>> *BKM*: Ch. 13, pp. 407-416 (3-factor model, liquidity factor)
>> *Readings-1*, Hawawini and Keim, "The Cross Section of Common Stock Returns"
>> *Readings-2*, Keim, "Financial Market Anomalies."

11   **Review and Synthesis**

12   EXAM #1 - THURSDAY, OCTOBER 3 – _IN CLASS_

13-14   V. Performance Evaluation

> *CN-11*, "Evaluating Managed Fund Performance"
>> *BKM*, Ch. 24 (all but pp. 833-835);
>>> Problems 8,9,10

VI.   Investment Strategies: Implementation and Costs

15-16   A. Trading, Trader Behavior, Trading Costs

> *CN-12*, "Measurement and Control of Implementation Costs"
>> *BKM*: Ch. 3, pp. 62-73
>> *BKM*: Ch. 12, pp. 373-384 (Behavioral Finance);
>>> CFA Problems 1-2
>> *Readings-3*, Keim and Madhavan, "Costs of Institutional Equity Trades"

17-19   B. Topics in Implementation of Active Portfolio Strategies

> *CN-13*, "Topics in Implementation of Active Portfolio Strategies"
>> *BKM*: Ch. 3, pp. 74-82 (margin, short sales)
>> *BKM*: Ch. 8, pp. 262-271 (Treynor-Black)
>> *BKM*: Ch. 24, pp. 817-823 (Treynor-Black for Hedge Funds)
>> *BKM*: Ch. 26, pp. 881-886, 899-902 (HF Strategies, HF Fees)

20-22 VII. Some Issues in the Pricing of Fixed Income Securities

> *CN-14*, "Bond Valuation Principles"
>> *BKM*: Ch. 2, pp. 27-40 (types of money market and fixed-income securities)
>> *BKM*: Ch. 14 (bond prices and yields);
>>> Problems 6,13,14
>> *BKM*: Ch. 15 (term structure of interest rates);
>>> Problem 17
>> *BKM*: Ch. 16, pp. 496-522 (skip pp. 510-513) (duration & immunization)
>>> Problems 3,4,8

23-24 VIII. Long-Horizon Investing/Defined Benefit Pension Plans/Endowments

      CN-16, "Long-Horizon Investing"
        BKM, Ch. 5, pp.147-151 (simulating long-horizon returns)
        BKM, Ch. 20, pp. 657-659, 663-671, 675-678 (some background on option pricing)
      CN-17, "Defined-Benefit Pension Plans"
        BKM, Ch. 28, pp.951-954 (DB vs DC Pensions)
        Readings-5, Bodie, "Shortfall Risk and Pension Fund Management"

25   Review and Synthesis

26   EXAM #2 - TUESDAY, NOVEMBER 26 – *<u>IN CLASS</u>*

27-28   IX. Further Diversification Possibilities: Real Estate (REITs), International

      CN-18, "Real Estate Stocks in a Diversified Portfolio"