

Functional and Strategic Finance 1460 Winter 2010 Robert C. Merton

This is a course organized around applying finance science and financial engineering in the design and management of global financial institutions, markets and the financial system. The approach is used to understand the dynamics of institutional change and the design of financial products and services. We also examine the needs of government as user, producer and overseer of the financial system, including the issues surrounding measuring and managing risks in financial crises. In the fast changing environment of the financial system, we try our hand at predicting where things will be in the impending future instead of focusing on where they are now. We will develop the necessary tools of derivative pricing and risk measurement, portfolio analysis and risk accounting, and performance measurement to analyze and implement concepts and new product ideas. We will apply these tools to analyze aspects of the financial crisis of 2008-2009.

The course focuses on a functional perspective in which institutions, markets and financial instruments are all considered tools of the financial engineer for implementing financial functions in the most effective manner at a given time and in a given geopolitical environment. The categories of institutions considered are governmental, private-sector, and family-based.

Those considering whether to take the course are encouraged to look at ["The Design of Financial Systems: Toward a Synthesis of Function and Structure," Robert C. Merton and Zvi Bodie, *Journal of Investment Management* 3, no. 1 \(First Quarter 2005\): 1-23 and Chapters 1 and 8 of Crane, D.B., K.A. Froot, S.P. Mason, A.F. Perold, R.C. Merton, Z. Bodie, E.R. Sirri, and P. Tufano, eds. *The Global Financial System: A Functional Perspective*. Harvard Business School Press, 1995.](#)

Courses that fit well with this course are:

Investment Management
Capital Markets
Corporate Financial Engineering

Course Organization:

The teaching structure for this course is different than the typical HBS course. Out of the 29 sessions, there will be approximately 4-5 formal case-study preparations. The balance of the classes will be hypothetical situations to analyze for class discussion and "interactive" lectures. The preparation material for interactive lecture classes will be readings and in some cases, a list of thought questions. Class participation on lecture days comes either from sharing your conclusions to the thought questions ("cold calls" happen here as they would on a case day) or from asking "good" questions...ones that either enrich the discussion or help you and the rest of the class understand better what is going on. Unlike a stereotypical case discussion, in interactive lecture discussions, asking substantive (not just clarifying) questions is strongly encouraged. The absolute amount of student airtime for class participation will be less than for a typical course. This reduced opportunity will be in part offset by written homework assignments that are included in measuring individual class participation, which will make up 45% of the final grade.

Career Perspective of the Course

Students pursuing careers in the financial-services industry and financial markets, including professional asset management (i.e., within investment counseling firms, insurance companies, mutual funds, hedge funds, etc.), investment, merchant and commercial banking, institutional sales and trading, product design and internet advisory for personal financial services. The course is equally appropriate for students interested in pursuing public-sector careers particularly in central banks and ministries of finance in both developed and emerging countries.

Educational Objectives of the Course

The goal of the course is to help prepare students for a long-term career as a finance professional in the financial-service industry or in government. The course develops a conceptual framework and the analytical tools to support decision-making in 1) the development and delivery of those services to clients of a firm; 2) the design and management of the financial-service firm itself and 3) the design and oversight of a financial system. With the long-run horizon in mind, the emphasis is on topics and tools that are believed to have a long "shelf life" of usefulness even in a rapidly changing institutional and technology environment that characterizes the global financial system. It is thus more of a "big-issue" and "conceptual-tools" course. Nevertheless, the issues are addressed from a rigorous analytical framework and a comfort level with mathematical manipulations will be helpful. It is expected that the students will master the finance tools, so they can apply them in a wide range of design situations.

Course Mechanics

Preparation

In general, whether the materials for the class are cases, readings, or web sites, preparation for class participation should be the same as for a typical HBS class. Read the case or go to the web site and prepare for discussion of the assigned questions. For non-case materials, there are two categories of reading given for the assignment: *required reading* means that the material be studied in detail and is required for class; *optional reading* means that the material is not required for class. Readings in the optional category will be typically either to provide additional coverage for those who would like to have more examples to help them to better understand the concepts in the required readings, or to provide a more quantitative approach to the material in the required readings for those who have the mathematical background to handle it. Sometimes it will be used to provide added breadth for those who are especially interested in that subject. In class sessions (typically lectures) for which no discussion questions are given in advance, preparation consists of doing the assigned reading and developing questions, both clarifying and substantive, to ask in class. In all situations, the tradition of "cold calls" will be observed. A summary of the "take-away" will be provided at the end of each class.

Course Requirements

1. *Background* First-Year Finance I & II or their equivalent is required. The subject matter of the course will involve areas that are among the most analytical and technical in the field of finance. Facility with mathematical and statistical analyses and formulas is important. All students are presumed to be proficient in using Excel spreadsheets for model building and analysis. Many of the students in the class will have taken several other finance courses.
2. *Written assignments*: Since most classes are either in lecture format or are non-case classes, there will be written assignments during the term as evidence of participation, in addition to the usual oral discussion in class. There will be a proctored final exam.
3. *Regular class attendance, preparation, and participation in class discussions are expected. There are no auditors.* Please bring your name card to class. If you do not display your name card, it is likely that you will be marked absent. **If you would like "credit" for attendance when you are physically going to miss a class (for other than acute hardship events), you must submit written answers/discussion of the assignment for that class before the class meets. This can be done by email, with an attachment or not.**
4. Codes and Procedures of the Honor System and the MBA Program Standards are applied to attendance.

Grading

Course grades will be based 45% on class participation and written class assignments and the balance on the final exam. My assistant, Hoan Soo Lee, will record attendance and participation in each class. He will also assist, under my direction, in grading written assignments. I will make the final assessments of performance and grades, on class participation, written assignments during the term, and the exam.

Office hours

I will hold office hours by appointment on days that the class meets. I regularly check my email, but please send ones of urgency CC to my assistant, Linda Arricale, at larricale@hbs.edu or call her at X5-6695. My course assistant, Hoan Soo Lee, can be contacted at holee@hbs.edu.

OVERVIEW

Course Textbooks

Derivatives Markets, Robert L. McDonald, 2nd Edition, Addison Wesley, 2006
Capital Ideas, Peter L. Bernstein, Paperback Edition, Wiley, 2005
Continuous-Time Finance, Robert C. Merton, Revised Edition, Blackwell, 1992.

Note: The textbooks have a technical character of varying degrees of difficulty but the course focus is not on the heavily technical dimension of the topics covered.

Classes

I. The Functional Perspective and Understanding Institutional Change

1. The Functional Perspective and Basic Derivative Contracts
2. Alternative Institutional Forms for Taking a Specific Risk Exposure
Case: BEA Associates: Enhanced Equity Index Funds, HBS Case # 9-293-024
3. Basic Mean-Variance Portfolio-Selection and Asset Pricing: Performance Benchmarks

II. Risk Measurement and Risk Management: Tools and Analysis

4. Risk Measurement and Risk Accounting: Estimating the Cost of Capital with Off-balance-sheet Assets and Liabilities
5. Institutional Change in Financial Micromarket Structure: High-Frequency Trading
Guest Speaker: Bryan T. Durkin, Chief Operating Officer, CME Group
6. Risk Measurement for Non-traded Assets: Creating Tracking Portfolios
7. Portfolio Selection with Non-traded Assets: The Case of Human Capital

III. Trends in Asset Management

8. Separation of Alpha and Beta: Analysis of Hedge Funds
9. Asset/Liability Management: Endowment and Retirement Funds
10. Comparative Advantage versus Business Diversification: Alpha Transport
Case: Smith Breeden Associates: The Equity Plus Fund (A), HBS Case # 9-297-089

IV. Creating Value Through Risk Management

11. Strategic Integrated Risk Management for the Firm
12. Applying the Risk Balance Sheet Tool for Strategic Advice
13. Sovereigns: Measuring and Strategically Managing Country Risk

V. Options: Tools of Financial Engineering

14. Derivative Security Pricing and Risk Assessment: Dynamic Portfolio Replication
15. Decomposition and Recomposition of Risks: Arrow Securities as Financial Building Blocks
16. Black-Scholes Option Pricing: The Greeks
17. Using Forward-Looking Information in Embedded Security Prices: Implied Volatility and VIX

VI. Insuring of Financial Risks: Manifest and Latent Guarantees

- 18. Management of Guarantees: Contract Performance Assurance
- 19. Credit Risk: Pricing Corporate Debt and Credit Default Swaps
- 20. Case: The Risk of Stocks in the Long Run: The Barnstable College Endowment: HBS Case #9-296-073

VII. Lessons from the Financial Crisis of 2008-2009

- 21. 1998 vs 2008: The case of Long-Term Capital Management: Guest Speaker Dr. Eric Rosenfeld
- 22. Fact and Fantasy about Financial Crisis: Financial Innovation, Complexity, Transparency
- 23. Systemic Risk: Sources and Regulatory Solutions
- 24. Observations on Compensation System Designs

VIII. Tools for Analyzing and Management of Macrofinancial Risks and Crises

- 25. On The Dynamics of Macro Financial Crises: Measuring and Managing Risk Propagation Across Economic Sectors Guest Speaker Dr. Dale Gray, IMF
- 26. Government-Sector Risk Balance Sheet: Sovereign Wealth Funds, Reserves, Deposit Insurance, Pension Guarantees, and Social Security
- 27. Innovations: Securities to Replicate Dynamic Trading Strategies: Pre-Packaged Liquidity and Securities to Implement Central Bank Stabilization Operations

IX. A New Framework for Understanding Institutional Differences and Dynamics

- 28. The Design of Financial Systems: Towards a Synthesis of Function and Structure
- 29. Course in Retrospect