

**Foundations of Financial Markets C15.0002**  
Fall 2000

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### **Course Description**

This course covers the elements of financial markets, financial securities and how they are valued and traded. The perspective is that of the investment manager, responsible for the investment portfolios of insurance companies, banks, pension funds, mutual funds, endowment funds and personal trusts. What we cover in this course has obvious implications for stock selection strategies by individuals and for financial decisions within firms. However, these topics are covered in greater depth in other courses (Investment Principles C15.0041, Corporate Finance Topics C15.0008) and are merely introduced here. We discuss several outstanding problems of investment management, including the definition of appropriate standards of prudence, security valuation, performance measurement, the asset mix decision and alternative risk control procedures.

The textbook for this course is Bodie, Kane and Marcus *Essentials of Investments* (Irwin Fourth Edition). Other required readings will be distributed to the class. There will be a midterm and a final examination. The final exam will cover all of the material in the course, and the midterm will count towards the final grade when the grade on the midterm is higher than the grade on the final. ***The midterm examination will be held on October 30. The final exam date for the 11:00 class is Dec 18<sup>th</sup> 10:00-11:50AM, and the exam for the 2:00 class will be held on the same day Dec 18<sup>th</sup> 2:00-4:50PM.*** Given the respective class sizes, it is not feasible to take your exam with the other class.

This semester we are introducing a one credit Core Enhancement which will involve a series of EXCEL exercises, and completion of the enclosed Endowment Fund case. ***This case will be due no later than the class that meets on November 13.*** Please note that this case must be completed on an individual basis. Any joint work or copying of assignments will be regarded as a violation of the Stern Honor Code, and will be treated accordingly. These assignments will count towards no more than 25% of the final grade.

It is most important that students keep up to date with the reading for this course. The closed book midterm and final examination questions will be taken from the Concept Checks<sup>1</sup> and mini cases that appear in the Syllabus, and from problem sets and assignments that are distributed on a regular basis through the Semester. Cases not found in the textbook will be distributed to class, and most of these will be discussed in class. ***Class participation is extremely important and will be accounted for in determination of the final grade.***

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<sup>1</sup>Concept Checks are problems that are interspersed in the text. A worked answer for each of these problems appears at the end of the chapter in which the concept check appears. For example, the Concept Check 5.1 that pertains to the first lecture can be found on page 131 of the text, and an answer is provided on page 149.

I will make every effort to make available to the class paper copies of all overhead transparencies prior to class. If there is any material in the lectures or the handout material that you feel is unnecessarily obscure, please fill in the comment sheet at the end of the day's handout or see me in my office after class. All lectures and problems sets will be available on the course page [www.stern.nyu.edu/~sbrown/foundations](http://www.stern.nyu.edu/~sbrown/foundations) and students must check in each week to register completion of the homework assignment for that week.

### **Prerequisites**

C22.0103 Statistics for Business, V31.0002 or V31.0004 Economic Principles, C10.0001 Principles of Financial Accounting (co-requisite), and Sophomore Standing

## **The Stern Honor Code**

***I will not lie, cheat or steal to gain an academic advantage, or tolerate those who do.***

The Stern community believes that honesty and integrity are qualities necessary for rewarding academic and professional experiences. These qualities form the basis for the strong trust among all members of the academic community (students, faculty, and administrators) that is essential for excellence in education. The purpose of the Honor Code is therefore to express a commitment to promote principles of honesty, integrity and trust among Stern students. Therefore, prior to entering the program, each student is asked to commit to the principles of this Honor Code and by signing the Honor Code agrees to abide by the Code.

The Honor Code requires that each student act with integrity in all academic activities and that each student endeavors to hold his or her peers to the same standard.

Violations of the Honor Code include:

Lying - Lying includes knowingly communicating an untruth in order to gain an unfair academic advantage or omitting to state a true statement when under the circumstances a person of integrity would be expected to disclose a matter.

Cheating - Cheating includes using unauthorized materials to complete an assignment; copying the work of another student, or representing another's work as one's own work (plagiarism); falsifying one's identity by having someone take an exam; unauthorized providing of materials or information to others during exams; and any other activity which gives a student an unfair academic advantage. All communications, written, oral or otherwise, among students during examinations, as are forbidden, as is the use of notes, books, calculators or other written material except when approved by the instructor,

Stealing - Students are required to submit their own work. Ideas, data, direct quotations, paraphrasing, or any other incorporation of the work of others must be clearly referenced. To do otherwise constitutes plagiarism, which is using the work of another without giving proper credit.

This list is not inclusive, and is included for illustrative purposes.

Upon witnessing a violation of the Honor Code, a student has a moral obligation to inform the student whose conduct is believed to be in violation of the Code that the Code has been violated. Each member of the Stern community, as a person of integrity, has a personal obligation to adhere to this requirement. The student also has the right to inform a member of the faculty.

## Syllabus

Week 1: Sept 6,11

Investors and the Investment Process

Case: *Matter of Morgan Guaranty Trust*

Readings: BKM Chapters 1,5

Concept Check 5.1, 5.3

*What are the investment objectives of individual and institutional investors? What constraints apply? An examination of the prudent person rules that govern the behavior of investment managers reveals that the conduct of the manager based on the information available at the time investment decisions are made is crucial. Past performance alone is no guarantee that the manager is acting responsibly, particularly where the performance is obtained at the cost of unnecessary risk.*

Week 2: Sept 13,18

Principles of Security Valuation

Case: *BKM Problem 13.12*

Readings: BKM Chapter 13

Concept Check: 13.1,13.2,13.3,13.5

*The idea that a financial security is worth no more than the present value of the stream of anticipated payments is a very basic principle of security valuation. We motivate this general idea, and illustrate it in the context of equity, fixed income and real estate valuation. An understanding of this idea suggests why it is so hard to predict future movements in security values.*

Week 3: Sept 20,25

Mathematics of Return

Case: *BKM Problem 2.2*

Readings BKM Chapter 2.1,6.1

Concept Check: 2.1, 6.1

*Comparison of rates of return is often a shortcut to valuing different financial securities. Unfortunately, there is no general consensus as to how to measure rates of return. Arithmetic, geometric, and internal rates of return are often confused with each other and with measures such as bank discount rates. Each of these measures of return are used in different contexts and for different purposes and should not be confused.*

Week 4: Sept 27, Oct 2

Equity risk and return

Case: *BKM Problem 6.11*

Readings: BKM Chapter 2.3, 2.4, 6.2, 6.5, 6.6

Concept Check: 2.5, 2.6, 6.2, 6.3, 6.4, 6.6

*Defines notions of return and risk for equity securities and for portfolios of securities. Compares the risk and return features of stocks and bonds, and shows how equity risk can be modified by considering a portfolio of stocks and bonds.*

Week 5:

Oct 4, Oct 9

Diversification with two risky assets

Case: *BKM Problem 7.6-7.10*

Readings: BKM Chapters 7.1-7.3

Concept Check: 7.1, 7.2, 7.3, 7.4

*Examines the risk and return attributes of portfolios of securities, and identifies the correlation between security returns as a central component of portfolio risk.*

Asset Allocation

Case: XYZ Corporation

Readings: BKM Chapter 7.4, 7.5

Concept Check: 7.5

*Identifies the asset mix decision as the central policy problem of investment management, and shows how portfolio theory can be used to construct long term asset mix guidelines. Introduces the notion of asset liability matching*

Week 6:

Oct 11, Oct 16

Asset Allocation (Continued): Many risky asset case

Readings: BKM Chapter 4.3, 4.6

International Diversification

Case: *BKM Problem 20.1, 20.2*

Readings: BKM Chapter 20

Concept Check: 20.1, 20.2

*Does international diversification increase portfolio risk or decrease it? The answer to this question depends on the extent to which the components of international risk, equity risk, currency risk, and political risk are diversifiable in the investor's portfolio*

Week 7:

Oct 18, Oct 23

Capital Asset Pricing Models

Case: *APT in Action*

Readings: BKM Chapter 8

Concept Check: 8.1, 8.2, 8.3, 8.4, 8.6

*The idea that there may be a finite (and small) number of nondiversifiable sources of risk leads to an Arbitrage Pricing Theory that defines the return investors expect from capital assets. We study the foundation of this model and the relationship to the related Capital Asset Pricing Model, and show how the model is applied in practical investment management.*

Week 8: Oct 25, Oct30

Performance Measurement

Case: *Growth Management*

Readings: BKM Chapter 19

Concept Check: 19.1,19.2,19.3

*Past performance alone does not guarantee future performance. Sophisticated performance measurement tools examine the extent to which components of performance can be related to the conduct of the manager.*

**Midterm Examination** (October 30)

Week 9: Nov 1, Nov 6

Performance Measurement (Continued): Performance Attribution

Fixed Income Analysis

Readings: BKM Chapter 10

Concept Check 10.1,10.2,10.3,10.4,10.5,10.6

*How do fixed income securities work and how are they valued? Why should bonds of different maturities offer different yields? The fact that longer term bonds usually offer higher yields, suggest that part of the difference is a premium for bearing interest rate risk, since exposure to this risk increases with time to maturity.*

Week 10: Nov 8, Nov 13

Fixed Income Analysis (Continued): Fixed Income Valuation

Managing Fixed Income Investments

Readings: BKM Chapter 11

Concept Check: 11.1, 11.2, 11.3, 11.4, 11.5, 11.6

*Duration measures how long investors tie their money up in fixed income securities. It is also for this reason, a measure of the investor's interest rate exposure. Immunization and related strategies attempt to minimize interest rate risk exposure by arranging the investment portfolio such that the duration of the assets matches the duration of the investor's liabilities.*

**ENDOWMENT FUND CASE DUE IN CLASS NOVEMBER 13!**

Week 11: Nov 15, Nov 20

Managing Fixed Income Investments (Continued): Immunization

Options: Characteristics and Payoffs

Readings: BKM Chapter 16

Concept Check: 16.1, 16.2, 16.3, 16.4

*Options and futures contracts are examples of derivative securities, whose value depends on the value of some other traded security. For some investors, derivative securities offer the cheapest way to capitalize on information that the underlying security will rise (or fall) in value. For other investors, derivative securities provide an insurance function. To understand derivative securities, it is first necessary to understand how the value of the derivative varies with the value of the underlying security.*

Week 12: Nov 22, Nov 27

Options: Characteristics and Payoffs (Continued): Payoff Diagrams and Put-Call Parity

Option Valuation

Case: *Analytic Optioned*

Readings: BKM Chapter 17

Concept Check: 17.1, 17.2, 17.3, 17.4

*An analysis of the relationship between the value of the derivative and the value of the underlying security suggests a simple approach to valuing the derivative. We illustrate this in the context of option pricing, and introduce the notion of hedging.*

Week 13: Nov 29, Dec 4

Option Valuation (Continued): Hedging and an approach to Black Scholes

Futures Contracts

Readings: BKM Chapter 18

Concept Check: 18.1, 18.2, 18.3, 18.4, 18.5

*Futures contracts are a special case of a derivative security. The special features of these contracts are best understood by reference to related forward contracts and to the history of futures contracts trading in the United States. In investment management, they are chiefly used to hedge security risk ("short positions") or to provide an inexpensive way to invest in the markets ("long positions").*

Week 15: Dec 6, Dec 11

Futures Contracts (Continued): Financial Futures

Portfolio Insurance

Case: Portfolio Insurance Case

Readings: BKM Chapter 17.4

*An analysis of this case provides a useful summary of the material covered in this course.*

## CASE ABSTRACT

### Endowment Fund Management

Case due November 13, 2000

**Case Author** Professor Stephen J. Brown, NYU Stern School of Business

#### Case Overview

Eli University, has hired an investment advisory firm to review the investment plan of the Eli Foundation. The university has been doing well and has consequently made many improvements that have increased costs beyond the rate of inflation. However, it is not feasible to raise tuition further. Basic analysis of the fund under reasonable projections for the rate of return, inflation, and gifts indicates that its projected income will be insufficient. The fund consequently adopted three new investment and spending policies: 1) adopt a *total* return standard for investment; 2) retain outside money managers instructed to maximize *total* return, and 3) implement an equation to determine annually the maximum that can prudently be spent from the endowment under the total return investment policy. However, the Eli Foundation feels uncomfortable exploiting its new-found freedom to invest in the equities markets. As a result, the Foundation has turned to three of its most famous alumni who run Endowment Partners Company (EPC). EPC has been given authority to manage the entire endowment. As a result, the portfolio allocation for the overall endowment went from 55.8 to 72.1 percent in equities, 35.8 to 12.7 percent in fixed income, 5.2 to 5 percent in real estate, and 3.2 to 10.2 percent in cash equivalents. Francesca Brown, CFA, a young associate at the investment advisory firm of Portfolio Management Consultants (PMC) has been assigned the task of reviewing the investment plan of the Eli Foundation and EPC's approach to managing the endowment. She is not sure that the financial plan adopted by Eli will lead to the financial equilibrium the Foundation seeks. Further, she is concerned about the delegation of the asset allocation function to EPC. Yet she is concerned that one year's performance is not enough to judge their performance.

#### Key Tasks Required by the Case

- ! What problems result from the lack of an explicit investment policy statement?
- ! Is there anything obviously lacking in the current financial plan?
- ! What asset allocation will lead to financial equilibrium given the projections generated in the context of the new Campaign for Eli?
- ! To what extent is the current asset allocation responsive to the short-term cash needs of Eli? In other words, is the current spending rule consistent with the need to establish long-term financial equilibrium?

### **Achieving Financial Equilibrium at Eli U**

Francesca Brown, CFA, a young associate at the investment advisory firm of Portfolio Management Consultants (PMC) has been assigned the task of reviewing the investment plan of the Eli Foundation, the endowment fund of Eli University. Last year at this time the Foundation made major changes in the way the endowment funds were managed. PMC has been approached by Eli to review these changes, and recommend any adjustments in light of the experience of the last year.

#### **The Financial Condition of Eli University**

A first step in understanding Eli's current financial condition is to review its recent history. The past ten years were a decade in which Eli grew in both size and quality. It strengthened its faculty and facilities, enlarging its student body, and established important new academic programs. During the same decade, Eli, like all major private universities, was subjected to economic forces that significantly and adversely affected its financial health.

During much of the recent past favorable external factors, including moderate rates of inflation and a favorable stock market obscured this tendency and provided an opportunity for improvement and growth. The booming stock market has led to a rise in the value of and income from the endowment, and to an unprecedented growth in individual giving. From these external factors Eli benefitted immensely, experiencing a period of dramatic growth in enrollment and improvement in the quality of its educational and research activities. Old programs were strengthened; new programs begun. Salaries were improved to make Eli competitive in recruiting faculty and staff. Financial aid was increased, and in Eli College a policy of admission without regard to financial need was adopted.

Unfortunately, these improvements led to substantial cost increases beyond the rate of inflation. At the same time, there was a dramatic reduction in support from foundations and the state and federal governments. The tuition at Eli was already high by national standards, and it was not considered feasible to raise it much higher. The tendency for costs to outrun revenues began to reassert itself. In the summer of 1998, when planning began for the budget of 1999-2000, it was recognized that Eli faced serious financial problems. The University initiated a freeze on the filling of all clerical and technical positions as they became vacant. At the same time the President's office, in cooperation with the Departments and Schools, began to investigate ways in which the educational budget could be cut.

At the same time, Eli established an ad hoc committee to develop plans for a major capital campaign, which was publicly launched in the spring of 1999 as the *Campaign for Eli* and undertook an elaborate projection of Eli's financial outlook for a twenty year period based on various assumptions concerning the rates of return on endowment, the rate of inflation, annual gifts, and the like. To maintain the mission of Eli through the twenty-first century, the endowment would need to return at least 4.75 percent over and above inflation to guarantee long-term financial equilibrium at Eli. As a result, a study group was formed to reassess the investment policies of the endowment. The recommendations of this group were accepted and implemented in the summer of 2000.

#### **The Financial Plan Adopted in 2000**

In 2000 Eli adopted investment and spending policies that had and continue to have significant bearing on Eli's financial position. There were three major elements to these changes. First, the decision was made to adopt a total return standard for investment. It was felt that the poor performance of the Endowment prior to 2000 arose from an undue emphasis on yield as opposed to the potential for capital gains. Second, outside money managers were retained with specific instructions to maximize total return.

The Foundation wanted to ensure professional management of the fund assets, as the investment committee of the Foundation had not always been successful in managing the assets of the fund in the past. Third, an equation was implemented to determine annually the maximum that could prudently be spent from the endowment under the total return policy for investment. This was to ensure that current spending would not deplete fund assets, and so deprive the Foundation of the opportunity for future growth.

The Eli Foundation has been very satisfied with these changes. Over the past year, the return to the endowment has increased dramatically, and the university has been able to increase funding in those areas it considers critical to its mission.

Before 2000 the endowment was managed to maximize income while preserving the capital of the endowment. The new total return standard is essentially a decision to invest endowment (unless restricted by the conditions of the gift) on a total return basis -- that is, to invest so as to maximize total return by taking full advantage of both appreciation (realized and unrealized) and annual yield (interest and dividends). This approach relieves the manager from having to seek a minimum yield in any one year, and permitted them to seek to obtain the best possible combination of appreciation and yield over the long run. As a result, the portfolio manager could, for instance, include in the portfolio "growth" companies that reinvest their earnings if this gave promise of greater total return.

However, the Eli Foundation felt uncomfortable exploiting this new-found freedom to invest in the equities markets. As a result, the Foundation turned to three of its most famous alumni, people who had made names for themselves as growth fund managers on Wall Street. The newly formed Endowment Partners Company (EPC) was given authority to manage the entire endowment that was not otherwise restricted by the terms of the gift. As a result the portfolio allocation for the overall endowment went from 55.8 percent equities, 35.8 percent fixed income 5.2 percent in real estate and 2.3 percent in cash equivalents (the remainder in other investments) to 72.1 percent equities, 12.7 percent fixed income 5 percent real estate and 9.4 percent in cash equivalents. The time-weighted return on the entire endowment has been only slightly less than that of the S&P500 over the same period. Needless to say, the Eli Foundation has been most satisfied with the performance of EPC over the past year.

The third important step in the new financial plan was adoption of an equation to determine annually the amount that can be spent given this new total returns investment policy. Naturally, the decision to invest endowment on a total returns basis meant that yield on endowment could no longer serve as a guide to spending. The alternative which Eli adopted called for using as a guide the weighted average of total returns of past years, with considerable weight given to the experience of the more recent years. The provision for averaging investment results over several years is designed to smooth out the annual fluctuations in the appreciation component of total return. As the return on the endowment has been so favorable in the past year, application of the formula has lead to a much needed increase in university wide spending.

The Eli Foundation appears to be quite satisfied with this new financial plan, and feels that it will go a long way to resolve the current crisis in funding, and will go a long way to establishing a new era of financial equilibrium at Eli U.

### **The Task**

Francesca recognizes that the financial circumstances of Eli U. are common to many institutions of higher learning in the United States, and that the management of endowment funds are coming into much more

serious focus as other sources of funding are diminishing. She is not so sure, however, that the financial plan adopted by Eli will lead to the financial equilibrium that the Foundation seeks. In particular, she is concerned about the delegation of the asset allocation function to EPC, and she is not sure that one year's performance is enough to judge their performance in this regard. Several questions concern her:

Is there anything obviously lacking in the current financial plan, as it relates to the management of the Eli endowment?

What is the asset allocation she would recommend to attain financial equilibrium given the projections generated in the context of the *Campaign for Eli*?

To what extent is the current allocation responsive to the short term cash needs of Eli? In other words, is the current spending rule consistent with the need to establish long term financial equilibrium?

In this analysis, she used the recent history of the capital markets to develop some working assumptions about reasonable prospects for the investment performance of the fund:

	Expected Return in excess of Inflation (%)	Standard Deviation of Returns (%) <sup>2</sup>	Correlations			
			Equity	Small Stock	Fixed Inc.	Real Estate
Diversified Equity Fund	12.45	15.89	1.0	0.74	0.37	0.13
Small Stock Growth	10.73	26.72	0.74	1.00	0.14	0.33
Fixed Income	6.81	6.54	0.37	0.14	1.0	-0.31
Commercial Real Estate	5.96	4.91	0.13	0.33	-0.31	1.0
Short term	1.00					

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<sup>2</sup>Note that this is the annual standard deviation. Standard deviation of the 20 year average return would be given as this number divided by the square root of 20.