

**PRINCETON UNIVERSITY: Woodrow Wilson School of Public and International Affairs
International Affairs**

WWS 505--FINANCIAL MANAGEMENT OF ORGANIZED ECONOMIC ACTIVITY

SPRING TERM 2005

PRECEPTOR:

To be announced.

INSTRUCTOR:

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REVIEW SESSION:

To be announced.

LECTURES:

Mon, Wed 8:30-10:00 a.m.

A. COURSE OBJECTIVE

This course has been designed to introduce graduate students in public and international affairs to certain principals and analytic tools widely used in the financial management of organizations, be they privately or publicly owned. The course is based on the premise that future civil servants should be familiar with this subject matter, either because they may be involved in the financial management of public agencies, or negotiate financial contracts with the private sector, or regulate financial management in the private sector.

To illustrate, principles of sound financial management lie at the core of the ongoing dispute over the highly controversial decision by the U.S. Air Force to lease a fleet of 100 aerial refueling tankers from the Boeing Co. Professionals working for public agencies involved in economic development abroad commonly find themselves confronted with problems in financial management. Finally, designing public policies on the pharmaceutical industry often require a firm grasp of corporation finance.

Although intended for future civil servants, the structure and content of the course resembles that of a first-year M.B.A. course in financial management, although some topics normally included in such courses will be traded-off in favor of topics in consumer finance, which requires constant vigilance on the part of the public sector. The level of technical difficulty in the course will be pitched to students in the B-track of the MPA program, and the emphasis will be on theories and analytic techniques that have practical application.

Given its objective, the course is open only to graduate students in the MPA and Ph. D. programs of the Woodrow Wilson School. Students in departments or programs outside the Woodrow Wilson School should take the relevant courses in finance offered by the Bendheim Center for Finance or by the Department of Economics. MPA and Ph.D. candidates in the C-track of the Woodrow Wilson School also might prefer the more advanced finance offerings in the latter programs, although some of these lack the practical orientation of this course.

B. TEXTBOOKS AND READING ASSIGNMENTS

The lectures in the course draw heavily on Eugene. F. Brigham and Michael. C. Ehrhardt, *Financial Management: Theory and Practice*, (11th. edition, 2004), a textbook known for its practical bent. It has been ordered by the U-Store, along with the Study Guide that accompanies the text.

C. FINANCIAL CALCULATOR

It will be assumed throughout the course that students have and bring to every lecture an electronic calculator programmed with the basic financial formulas mentioned in the text. These calculators vary greatly in terms of sophistication and price. For this course, the relatively low-cost *Texas Instruments BA-35 Student Business Analyst* will do. It costs about \$20 and incorporates a variety of useful financial functions, including special functions to calculate bond yields.

D. SPREADSHEET ANALYSIS

During the first two weeks, the course involves the completion of stylized, hand-written homework exercises. Thereafter the course emphasizes spread-sheet analysis. It will be assumed that, by then, every student in the course will be comfortably familiar with *Excel*, the workhorse on the Woodrow Wilson School's PCs. Students not familiar with that tool should purchase any one of the self-help books on *Excel* available in bookstores. If it is desired, it will be possible to organize special training sessions for students who are unfamiliar with spread-sheet analysis.

E. HOMEWORK ASSIGNMENTS

There will be a number of written homework exercises, about one per week. They will be graded $\sqrt{-}$, $\sqrt{}$, $\sqrt{+}$, roughly according to the following criteria:

- $\sqrt{+}$ (100 pts.) The answers are basically correct, and the workmanship is good to excellent.
- $\sqrt{}$ (80 pts.) The answers are basically correct; but the workmanship is wanting, **or** there are a few errors in the answers; but the workmanship is good to excellent.
- $\sqrt{-}$ (60 pts.) Quite a few answers are incorrect, whatever the workmanship may be, **or** the workmanship is shoddy, however correct or incorrect the answers may be.
- 0 (0 pts.) The assignment was not turned in, **or** it was turned in too late.

The average score on the homework assignments will be given a total weight of 20% in the overall course grade.

F. MIDTERM TEST AND FINAL EXAMINATION

There will also be an 80-minute midterm test (scheduled for Monday, March 7) and a three-hour, closed-book, written final examination at the end of the course. Students in the course should mark that date in their calendars, as pre- or postponements of the test will be granted only under truly exceptional circumstances (e.g., medical emergencies).

G. OVERALL COURSE-GRADE

The final letter grade for the course will be based on a score calculated as follows:

$$S = 0.20H + \max\{0.30M+0.50F, 0.15M+0.65F\},$$

where H is the average percentage score for the homework exercises, M is the percentage score on the midterm examination, and F is the percentage score on the final examination. This formula is designed to reduce the mortgage that an unexpectedly poor performance on the midterm test might place on the overall course grade.

Given the typical enrollment in this course and the nature of the work it requires, the customary evaluation of students, written in prose, would merely verbalize the quantitative grades earned with that work. Therefore, these written evaluations will be eschewed.

H. "AUDIT" CREDIT

To receive credit for an "AUDIT" on the transcript, students should (1) write the midterm test with a passing grade and (2) complete all but two of the homework exercises. As a rule, I do not negotiate around these terms.

Space permitting, however, anyone who wishes to do so may sit in on the course, to audit it without performing the work indicated above, as long as the notation of "Audit" on the transcript is not requested by that auditor.

COURSE OUTLINE

The abbreviation BE refers to the textbook by Brigham and Ehrhardt.

The topic numbers do not exactly coincide neatly with lecture numbers, as some topics may require more than one lecture session, depending on the discussion that emerges in class.

PART I: INTRODUCTION TO THE MATHEMATICS OF FINANCE

1. THE TIME VALUE OF MONEY PART 1: COMPOUND INTEREST

The objective in this part is to introduce students to the concepts of compound interest and the conversion of time-phased cash flows into their interest-rate-adjusted present and future values.

Reading Assignment: BE, Chapter 2, pp. 46 – 59 only. We shall go a bit beyond to text to explore the conversion of different interest-rate definitions in equivalents of one another.

Recommended Reading: Reinhardt, *Lecture Notes on the Mathematics of Finance* (a.k.a. "Hoo Hoo's Notes." Some students have found these lecture notes on the mathematics of finance helpful in the past. They are available on request.)

2. THE TIME VALUE OF MONEY PART 2: TIME-PHASED MONEY FLOWS (e.g. ANNUITIES)

Financial securities and real investment projects typically imply cash flows occurring at different points in time over an investment horizon. Mastering the mathematics of finance used in the conversion of such time-phased cash flows into present-value equivalents is fundamental to financial management.

Reading Assignment: BE, Chapter 2, pp. 59 – 77 only.

3. THE TIME VALUE OF MONEY PART 3: AMORTIZED LOANS AND CONSUMER CREDIT

In this part, the mathematics of finance are applied to sundry topics in consumer finance, an area in which fraud is common and which future civil servants will increasingly be called upon to monitor and regulate—chiefly mortgages and other forms of installment credit.

Reading Assignment: BE, Chapter 2, pp. 77-79.

4. THE DETERMINANTS OF THE INTEREST RATE USED IN FINANCIAL CONTRACTS

So far in our study of the mathematics of finance and financial contracts we have taken the interest rate embedded in these contracts as given. That rate may be viewed as a price – specifically, as the rental paid, per year, per dollar, for the use of someone else’s money. In this lecture, we explore how expected future inflation and the risk inherent in the underlying financial contract drive that rental price. We end up with an examination of the so-called “term structure” of interest rates (otherwise known as the “yield curve”), that is, the relationship between the time to maturity of a financial contract and the interest rate embedded in it.

Reading Assignment: BE, Chapter 1, pp. 26-39.

PART II: THE VALUATION OF REAL AND FINANCIAL ASSETS

In this part of the course, the mathematics of finance are applied to the problem of estimating the monetary value of assets, that is, real things or financial contracts that are expected to yield future cash flows. The discussion then extends to a study of the effect of risk on asset values. An important part of that discussion is how risk should be defined and measured for this purpose.

5. VALUING BONDS AND REAL ESTATE

Reading Assignment: BE, Chapter 6 (covers bonds only). For the valuation of real estate, material will be distributed in class.

6. VALUING OWNERSHIP CERTIFICATES: COMMON AND PREFERRED STOCK

Reading Assignment: BE, Chapter 7.

7. RISK AND ASSET VALUATION: DEFINING “STAND-ALONE RISK”

It makes intuitive sense that the discount rate used to convert a future cash flow into its present value equivalent should rise with the uncertainty (risk) associated with that cash flow. The question is how that risk should be defined and quantified. In this and the next two lectures, we shall review the state of the art on this issue.

Reading Assignment: BE, Chapter 4, pp. 126-39 and material to be distributed in class.

8. RISK AND ASSET VALUATION: THE RISK INHERENT IN PORTFOLIOS OF ASSETS

Reading Assignment: BE, Chapter 4, pp. 139-63; Chapter 5, pp. 172-83, and material to be handed out in class.

9. RISK AND ASSET VALUATION: THE CAPITAL ASSET PRICING MODEL (CAPM) AND ALTERNATIVE THEORIES

Reading Assignment: BE, Chapter 5, pp. 183-203, and material to be handed out in class.

PART III: CORPORATION FINANCE

Having laid the groundwork in the mathematics of finance and the valuation of assets, the course shifts in this part to the principles of the financial management of corporations, be they for-profit or not-for-profit. After a bird's-eye view of the subject, we shall examine the overall cost of financing the firm's activities and the principles of evaluating alternative uses of corporate funds (otherwise known as "project evaluation" or "capital budgeting").

10. AN OVERVIEW OF CORPORATION FINANCE: FINANCIAL STATEMENTS

The managers of corporation render a periodic accounting of their use of the financial resources entrusted to them and of the corporation's financial position to (a) owners, or trustees (b) potential investors or donors and (c) the government by means of standard quarterly and annual financial reports. It is important that you understand their basic structure and contents, as well as the limits of these communications.

Reading Assignment: BE, Chapter 3 (Financial Statements) and Chapter 13 (Financial Ratio Analysis).

11. MIDTERM TEST MARCH 7, 2005

12. THE COST OF FINANCING OF FOR-PROFIT FIRMS

Reading Assignment: BE, Chapter 9 (the main reading on the firm's cost of financing) and Chapter 19, pp. 647-668 and 675 to 678 only. (Chapter 19 covers the nuts and bolts of actually selling new financial securities in the financial markets. Because it is easy reading, we shall not waste lecture time on this material. It is assumed, however, that you will be familiar with this material. We shall cover the subject matter on pp. 668-674 of Chapter 19 on "Bond Refunding" in a separate lecture later.)

Recommended Reading: Chapter 16. (In Chapter 9, the firm's debt-to-equity mix is taken as given. Chapter 16 explores the Theory of the Firm's Capital Structure, that is, of the optimal mix of debt and equity in the financing of the firm. Chapter 17 extends the analysis even further.)

13. THE COST OF FINANCING OF NOT-FOR-PROFIT FIRMS

Traditionally, not-for-profit firms that were endowed by charitable donors did not apply modern techniques of corporate financial management to their operations. During the last decade, however, more and more of them have adopted these techniques lock-stock-and-barrel, with only minor modifications emerging from their tax-exempt status. In this lecture, we shall explore these modifications and the estimation of the cost of financing for not-for-profit firms.

Reading Assignment: Material to be distributed in class.

14. CAPITAL BUDGETING ASSUMING CERTAINTY: THE BASIC IDEA

The typical capital project requires cash outlays in the early life of the project, followed by hoped for cash inflows subsequently. In this and the following lectures, we shall explore methods of evaluating such cash flows in terms of their economic merit. We shall initially assume that all cash flows will occur with certainty. Thereafter we shall study how one can adjust the evaluation for the more realistic assumption that most such cash flows are surrounded by uncertainty.

Reading Assignment: BE, Chapter 10.

15. CAPITAL BUDGETING ASSUMING CERTAINTY: PROJECTING DIFFERENTIAL CASH FLOWS ATTRIBUTABLE TO PROJECTS (DEPRECIATION, TAXES, INFLATION, ENTITY vs. EQUITY CONCEPT)

Projecting the cash flow triggered by a decision to opt for one particular capital project, rather than to pursue other alternatives, is the art in capital budgeting. Many errors occur at that stage. We shall look at the basics of that art.

Reading Assignment: BE Chapter 11, pp. 379-97 only. (We'll cover the rest of Chapter 11 in the next lecture.)

16. CAPITAL BUDGETING ASSUMING CERTAINTY: A MORTGAGE-LOAN APPROACH TO CAPITAL BUDGETING (AMORTIZATION TABLES FOR PROJECTS, POSITIVE AND NEGATIVE IRRs, THE SO-CALLED "MODIFIED IRR")

Some capital projects have negative internal rates of return (IRR_s). Their interpretation is most easily understood if one views projects as "persons" who "borrow" money (the initial outlay) from a "bank" (the firm's treasury department) which, for any given period of the project's life, charges the project "interest" (equal to the appropriate cost-of-capital rate or WACC) on any amount lent to the project and not yet repaid through periodic cash inflows (the project balance outstanding at the beginning of the period). This approach is not found in textbooks, although it is very illuminating. We shall develop it in this lecture. (Reading Assignment: Material to be distributed in the lecture).

17. CAPITAL BUDGETING UNDER UNCERTAINTY

Financial theorists have developed a number of approaches to deal with the uncertainty surrounding time-phased cash flows. Some of these approaches are of more theoretical interest than practical import. The most commonly used approach in practice is sensitivity analysis, which can be made to incorporate elements of the CAPM.

Reading Assignment: BE, Chapter 11, pp. 397-409 and Chapter 12, pp. 419-27. (The reading in Chapter 12 introduces the idea that there are options embedded in many capital projects. The options have value that should, in principle, be included in the evaluation of investment alternatives. Some business firms, although by no means the majority of them, have begun to experiment with formal methods to include such valuations in their capital budgeting. The seminal article on this topic is Avinash K. Dixit and Robert S. Pindyck, "The Options Approach to Capital Investments," *Harvard Business Review*, May-June 1995: 105-115.)

PART IV: SPECIAL TOPICS IN CORPORATION FINANCE

18. RETIRING BONDS BEFORE MATURITY

On many occasions, corporations find it financially advantageous to retire an outstanding bond issue before the official maturity date of the issue. One can retire such bonds either with cash on hand or with cash procured from a new bond issue with lower coupon interest. We shall explore how the corporation, be it for profit or not-for-profit, should evaluate such decisions.

Reading Assignment: BE, Chapter 19, pp. 766-73 only.

19. LEASE FINANCING: THE LESSEE'S PERSPECTIVE

Reading Assignment: BE, Chapter 20, pp. 686-98 and 701-705.

20. LEASE FINANCING: THE LESSOR'S PERSPECTIVE

Reading Assignment: BE, Chapter 20, pp. 698-701.

21. FINANCIAL OPTIONS AND THEIR VALUATION

Reading Assignment: BE, Chapter 8.

***22. OTHER DERIVATIVES AND RISK MANAGEMENT: FUTURES, SWAPS, SECURITIZED ASSETS (STRUCTURED NOTES) AND INVERSE FLOATERS**

Reading Assignment: BE, Chapter 23. (Even if we do not manage cover this material formally in a lecture, you should read this eminently readable chapter to become familiar with these modern financial instruments and be able to describe their nature on an exam.)

22. BRINGING IT ALL TOGETHER: THE THEORY AND PRACTICE OF ENTERPRISE VALUATION

In this concluding lecture, we shall look at the problem of putting a value on entire, ongoing enterprises, with a real-life illustration of a business acquisition, to give students an idea of what actually goes on in corporate board rooms in connection with project evaluation. For students of public and international affairs, the issue of enterprise valuation is relevant also in the context of “privatization,” that is, in the conversion of hitherto state-owned enterprises into for-profit enterprises, or the conversion of private not-for-profit enterprises into for-profit enterprises. These conversions occur not only in the formerly socialist nations, but also in traditionally capitalist nations, such as the United States, where many hitherto not-for-profit entities of the health care sector have been converted into for-profit enterprises.

Reading Assignment: BE, Chapter 15 on “Corporate Valuations”, pp. 505-16. (Here the authors describe lucidly how financial analysts estimate the value of entire enterprises.)

* Time permitting