Finance 4050
Intermediate Investments

Spring 2008   Elizabeth Tashjian
Tuesday/Thursday 9:10-10:30, BuC 108   KDGB 410
office hours by appointment   585-3212 (office)
elizabeth.tashjian@business.utah.edu   581-3956 (fax)

Course Overview This course consists of three parts. The first and second parts of the course focus on two classes of securities, specifically, fixed income securities (the first part) and derivatives (the second part). We will define common securities in these areas, examine pricing models, and discuss how the securities can be used in investing.

The last portion of the class builds upon several topics in investments covered in Finance 3050. We will begin with a brief review of the concept of risk and return and discuss practical applications in investing, including methods for evaluating portfolio performance and historical returns on different asset classes. We will also discuss the impact of taxes on different types of investments and discuss behavioral finance.

You will have the opportunity to investigate some of the theories discussed in class first-hand through several problem sets. You will need daily access to security prices to complete some assignments.

Course Materials The required text for this course is *Investments*, seventh edition by Bodie, Kane, and Marcus (McGraw Hill-Irwin, 2008). You may wish to subscribe to the *Wall Street Journal* or some other newspaper. On some topics, I will prepare handouts to aid in note taking. Handouts will be available on WebCT.

Grades The course grade will be determined by your performance on four items: problem sets, two midterm exams, and a final exam. An assignment sheet is attached to this syllabus. Because I would like to grade and return assignments promptly, it is important that you turn in assignments on the scheduled date. The point distribution will be the following.

problem sets	20%
midterm exam 1	25
midterm exam 2	25
final exam	30

Exam Policy Students are expected to take exams at the scheduled times. If you are ill on the date of one of the exams, you must provide a written note from a physician or from a professional in student health services who has treated you on or about the date of the exam. You must notify me either by e-mail or voice mail <u>prior to the time the exam begins</u> if you are ill. If you are ill for one of the midterms, the points from that exam will be reassigned to the other midterm and the final exam. The final exam will be at the time scheduled by the university. Failure to abide by these policies will result in a zero for the missed exam.

ADA Policy The University of Utah David Eccles School of Business seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the instructor and to the Center for Disability Services, http://disability.utah.edu, 160 Olpin Union Building, 581-5020 (V/TDD) to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notice to the Center for Disability Services.

Class Schedule and Reading Assignments
Finance 4050   Spring 2008

Class Topic   **Readings** (Bodie, Kane, and Marcus)

Introduction and Preliminaries
Jan 8   Preliminaries handout

I.   Fixed Income Securities
      Jan 10   Spot and forward interest rates   Chapter 14 and FI handout
      Jan 15

      Jan 17   Term structure of interest rates   Chapter 15 and FI handout
      Jan 22   Bond prices and yields

      Jan 24   Fixed income management: Chapter 16 and duration handout
      Jan 29   Duration and immunization

II.   Derivatives
      Jan 31   What is an option?   Chapter 20 and option handout
      Feb 5   Arbitrage bounds and payoff diagrams

                    February 14: Midterm Examination 1

      Feb 7   Binomial option pricing model   Chapter 21 and BOPM handout
      Feb 12

      Feb 19   Black-Scholes option pricing model   Chapter 21 and BS handout
      Feb 21   Implied volatility   implied volatility handout

      Feb 26   Interest rate swaps   Chapter 23
      Feb 28

      Mar 4   Futures   Chapter 22 and futures handout
      Mar 6   Futures

      Mar 11   Value at Risk   VaR handout
      Mar 13

                    March 27: Midterm Examination 2

III.   <u>Individual Investing</u>

Mar 25 Apr 1	Portfolio Performance Evaluation	Chapter 24 and performance handout
Apr 3 Apr 8	Taxes and the Individual Investor	tax handout
Apr 10 Apr 15	Behavioral Finance	in-class handouts
Apr 17	Historical Asset Returns	Chapter 5

Review: April 22

FINAL EXAM
as scheduled by the University
(Friday, April 25, 8:00 a.m. – 10:00 a.m.)

Finance 4050 Assignment Sheet

Assignments are due in class on the date indicated. **Please hand in hard copies of assignments**. Except in special circumstances, **electronic copies are not acceptable**. Assignments will be accepted with a late penalty **prior to** the next class meeting. Later assignments will not receive credit. Problem numbers refer to **Problems** in the end of chapter problems in Bodie, Kane, and Marcus. Several of the problems require access to current security prices.

Assignment 1: due in class on Tuesday, January 29.

1.   Chapter 14: Problems 5 (assume r_2 and r_3 are the <u>one year forward rates</u> beginning at years 2 and 3, respectively) and 14 (pages 489-490).

2.   Find the following rates using values from a recent newspaper or from the on-line *Wall Street Journal* http://online.wsj.com/home/us. Please indicate the source of your data, and show all calculations. Pick dates that correspond as closely as possible to those in the problems, but don't worry about interpolation. Assume the pure expectations model holds. Express your answers in annual terms.
    a.   Find the 3-month and 6-month-month default risk-free interest rates using <u>T-bill prices</u>.
    b.   Find the 3-month forward rate three months from now using your answers from part a.
    c.   Find the prices for two default risk-free coupon bonds maturing in 3 or 6 months. Based on your answers to parts a and b (and the assumption about pure expectations), is the market for risk-free securities in equilibrium? Use some numbers. If the answer is no, construct a portfolio which is risk-free and will produce a guaranteed profit.

3.   Chapter 15: Problem 8 (pages 516-517) (in part a, "for year 3" means <u>beginning</u> in year 3).

Assignment 2: due in class on Tuesday, February 5.
Chapter 16: Problems 1 (assume yields <u>rise</u> by 0.5%), 5, and 10 parts a and c only (pages 559-560).

Assignment 3: due in class on Thursday, February 7.
Chapter 20: Problems 1 and 2 (page 726).

Assignment 4: due in class on Thursday, February 21.
Chapter 21: Problems 2 and 3 (pages 773-774).

Assignment 5: due in class Tuesday, February 26.
1.   Chapter 21: Problems 7 and 8 (page 775).
2.   Pick a stock with several actively traded options and select a maturity month between two and six months in the future. Print out all the closing prices for all the calls for that month (you might use Yahoo http://biz.yahoo.com/opt). For each strike price and corresponding closing option price, compute the implied volatility. (Note that if the

option price violates no-arbitrage conditions, you will not be able to compute implied volatility for that option.) Prepare a graph with strike price on the horizontal axis and implied volatility on the vertical axis.

Assignment 6: due in class Thursday, March 6.

1.   Consider two firms, Alta and Brighton.   They are offered the following terms for borrowing $50 million dollars for three years.

Firm	Fixed	Floating
Alta	7 ½	LIBOR + ¾
Brighton	8 ⅞	LIBOR + 1 ⅜

g.   Find the quality spread differential if the firms agree to enter into a swap.

h.   Design a swap to take advantage of the quality spread between the two firms' borrowing opportunities. Assume the spread differential is evenly divided between the two firms.

2.   Two companies, AAA and BBB, are offered the following rates for borrowing.   Both companies want to borrow $10 million for one year and make quarterly payments beginning December1, 2005.

	Fixed	Floating
AAA	10.8 %	LIBOR + 1/4%
BBB	12.0	LIBOR + 3/4

b.   What (use a number) is the quality spread differential?

c.   Design a swap to divide the gains evenly between the two firms.

d.   Based on your answer to c, complete the following table for the swap for AAA.

Date	3-month LIBOR	days from last pmt date	AAA receives	AAA pays	Net to AAA
Sep. 1, 2006	10%	–			
Dec. 1, 2006	11%	91			
Mar. 1, 2007	12%	90			
Jun. 1, 2007	11%	92			
Sep. 1, 2007	10%	92			

Finance 4050 Assignment Sheet

3.   Reciprocate, Corp. is a large swap dealer. It would like to price a $25 million fixed-for-floating rate swap. The swap will be for two years and will require semi-annual payments. The term structure of LIBOR is 12 percent for ½ year, 12.25 percent for one year, 12.75 percent of 1 ½ years, and 13.02 percent for two years. Find the fixed rate, assuming that Reciprocate wishes the initial value of the swap to be zero. [For simplicity, use round fractions of a year, rather than actual days.]

Assignment 7: due in class on Tuesday, March 11.
Chapter 22: Problems 6 and 11 (pages 809-810).

Assignment 8: due in class Tuesday, March 25.
Review the material on value-at-risk handed out in class. Your assignment is to use the Monte Carlo method to evaluate the value-at-risk of a simple portfolio consisting of an investment in an S&P index fund and a 20-year US Treasury bond.

You have $10,000 to invest in the two securities. You are restricted to investing in round lots of $1,000 (e.g., you could invest $2,000 in the S&P and $8,000 in T-bonds, or $5,000 in each, etc.). Pick your portfolio weights.

In conducting your Monte Carlo simulation, assume the following.

•   S&P daily returns are normally distributed with a daily mean of $0.11/250$ and a daily standard deviation of $0.2/\sqrt{250}$. Assume the S&P has no serial correlation.

•   The Treasury bond is a 20-year bond with coupon of 5 percent, payable semi-annually.

•   The current annualized interest rate is 5.0625 percent.   Interest rates evolve daily according to the following formula: $r_t = .0101 + .8r_{t-1} + .0005\varepsilon_t$, where ε_t has a standard normal distribution. Further, assume that the term structure is always flat.

•   Random changes in the S&P and in interest rates are uncorrelated.

Generate 200 simulated values of the change in your portfolio's value. Use the simulated changes to estimate the 1-day VaR of your portfolio for a 95% level of confidence.

Please turn in the first page of a table from your spreadsheet like the one in the VaR handout. (You do not need to turn in all 200 changes.) Also, include the first page of sorted changes in your portfolio's simulated value, along with your estimate of the value at risk.

Finance 4050 Assignment Sheet

Assignment 9: due in class Thursday, April 3.
Chapter 24: Problems 7 and 17 (pages 890-891 and 893).

Assignment 10: due in class on Thursday, April 10.

Consider the following investment opportunities.

Asset class	Total Return	Interest/div return
money market	4.5%	4.5%
municipal bond portfolio	6.5	6.5
corporate bond portfolio	8.5	8.5
large-cap stock portfolio: buy and hold*	11	3
large-cap stock fund: annual turnover*	11	3
large-cap stock fund: biennial turnover*	11	3
401-k qualified pension plan	11	3
Roth IRA	11	3

* Assume the assets in the buy and hold stock portfolio are held for 10 years. Assume all assets in the stock fund with annual turnover are sold one day short of the year. For the fund with biennial turnover, assume the entire portfolio turns over at the end of the second, fourth, sixth, eighth, and tenth years.

Assume you wish to invest the equivalent of $2,000 of your current pre-tax income in each of these investments and hold your investment, reinvesting any interest or dividends. At the end of year 10, you withdraw your proceeds from each investment. Calculate the expected after-tax value at the end of year 10 for each of these investments using the following tax rates. (Assume all bonds are bought and sold at par and that all dividends "qualify.")

year(s)	ordinary income	long term capital gains	dividends
1-9	35%	15%	15%
10	25	15	15