

Finance II – Professor Sapienza
Practice problems for midterm

1) Term structure. One year government bonds are currently yielding 5.5 percent. The current yield on two year government bonds is 6.5 percent. Historically, the return on one year government bonds has averaged 3.6 percent while the return on two year government bonds has averaged 4.6 percent. You can assume that one-year government bonds are risk free.

A) Is the β of two year government bonds zero? Explain.

B) What is the two year risk free rate?

C) You are considering investing your signing bonus in a one year t-bill. However, you won't receive your signing bonus for a year. Thus you would like to purchase a t-bill one year from now. What does the market expect the promised yield on this one year t-bill will be? This is the t-bill which will be sold one year from now and will payoff two years from now.

2) Nike has \$1B in Shoe assets, and \$150M in outstanding debt. β_{shoe} is 1.5 and β_D is .3. The market price of risk, $E[r_m - r_f]$ is 8.5 percent. The risk free rate is 5%. How much cash should NIKE hold such that $r_E=13.5\%$?

3) Expected vs. promised

Assume the following:

$I = \$1,000$

$T = 30$ years

$CF(\text{if solvent}) = \$25,000$

a) If $\beta = .6$, $r_f = 5\%$ and $(r_m - r_f) = 8.5\%$ what is the probability of default? Assume principal, but no interest is paid upon default.

b) What is $r_{promised}$?

3)

Financial statements for Medco are shown below. The 1999 and 2000 numbers are actual and the 2001 numbers are estimates

Income statement					
	2000	2001 (est.)			
Sales	3432	3560			
Costs	450	495			
Depreciation	510	570			
Interest Expense	830	950			
Pre-Tax Income	1642	1545			
Taxes	267	285			
Net Income	1375	1260			
Shareholder distribution	210	250			

Balance sheet, Year-end							
	1999	2000	2001(est.)		1999	2000	2001 (est.)
Current assets	5368	5900		Debt	9000	11000	
Net PPE	9000	11633	11000	Paid in capital	2034	2034	2034
Other assets	0	0	0	Retained Earnings	3334		
Total assets	14368	17533		Total liabilities +equity	14368		

A) Assume that Medco pays 8% interest on its debt. Further assume that interest expenses are calculated by multiplying the interest rate by the average of the current debt outstanding and the previous year debt outstanding. How much debt will be outstanding at the end of 2001? Show your calculation below (10).

B) Fill in the missing entries (all seven double-outlined cells) in Medco 2000 and 2001 balance sheets. Show any necessary calculation below. (10)

5) Financial options

A) Draw the gross payoff diagram for the following portfolio: sell one call option on a share of Ashton Technology Group with a strike price of \$100 and sell one put option on a share of Ashton Technology Group with a strike price of \$100. Both options have

one year to expiration. The one year risk free rate is 5.5 percent and the current stock price is 100. Make sure your diagram is clearly labeled.

B) Would you be willing to pay \$10 for the portfolio described in A)? Assume that you are fully diversified and the β of Ashton Technology Group's equity is 0.8. Hint: If this question seems very complicated, you are approaching it incorrectly or you may want to check your answer to A).

C) If your information or expectations differ from the market's and you are correct, you can make more than your required rate of return trading securities. What beliefs must an investor have for the portfolio described in A) to be a good bet.

6) **Real option**

United Airlines is thinking about beginning perpetual service between Chicago and Buenos Aires. To enter this market, United must purchase a new aircraft. They are considering the purchase of a 757 which can carry 200 passengers or a 747 which can carry 400 passengers. The prices and operating costs of the two aircraft models are shown below.

	Boeing 757	Boeing 747
Purchase Price	\$55 million	\$105 million
Annual Operating Cost	\$15 million	\$20 million
Passenger Capacity	200	400

The primary source of uncertainty facing United is the level of demand. First year demand is known with certainty - 200 round-trip passengers per day. However, demand in subsequent years is uncertain. With 50% probability, next year's demand will increase to 400 round-trip passengers per day and will remain at 400 in all subsequent years. With 50% probability, demand will stay at 200 round-trip passengers per day forever. Revenue is \$50 M annually per 200 daily round-trip passengers. So, revenue will be either \$50M or \$100M in the future. For simplicity, assume that first year cash flows are received immediately, next years cash flows are received one year from now, and so on. Further assume that there is no competition and the appropriate discount rate is 10%.

(A) Expected demand next year (and every year thereafter) is 300 round-trips per day. Using this expected level of demand, calculate the Net Present Value of purchasing the 747. Remember, the first year's revenues and costs occur immediately. (5)

(B) If the 757 is purchased this year, an additional 757 aircraft will have to be purchased next year to meet the expected demand of 300 round-trips per day. Suppose that United's decision to take delivery of the second 757 must be made today, but they pay for the aircraft next year (when it's delivered). Assuming that United commits to

taking delivery of the second 757 next year, what is the NPV associated with using 757s to serve the Chicago- Buenos Aires route? (10)

- (C) Suppose that Boeing offers to waive the requirement that United commit to the purchase of the second 757 immediately. What is the maximum amount United should pay for this waiver? (15)

7) Dividend/Repurchase

Luxottica shares have a stock price (cum-dividend) of \$100 and there are 100,000 shares outstanding. The firm has \$500,000 free cash flow and is planning to distribute all its cash flow to its shareholders.

