Class 1

Present value

Reading: BM: Chapters 2 and 3; GT: Chapter 9, pages 312-324.

Note: BM – Brealey, Myers "Principles of Corporate Finance", 6th edition

GT – Grinblatt, Titman "Financial Markets and Corporate Strategy", 2nd edition

Question 1

You have an opportunity to construct an office building on a plot of land appraised at $50,000. This investment has a positive NPV of $5,000 at a discount rate of 12 percent. Suppose E. Coli Associates, a firm of genetic engineers, offers to purchase the land for $58,000, consisting of $20,000 paid immediately and $38,000 after one year. U.S. government securities maturing in one year yield 5 percent.

a. Assume E. Coli is sure to pay the second $38,000 instalment. Should you take this offer or start on the office building? Explain.
b. Suppose you are not sure E. Coli will pay. You observe that other investors demand a 10 percent return on their loans to E. Coli. Assume that the other investors have correctly assessed the risks that E. Coli will not be able to pay. Should you accept E. Coli's offer?

Question 2

As winner of a breakfast cereal competition, you can choose one of the following prizes:

a. $100,000 now.
b. $180,000 at the end of five years.
c. $11,400 a year forever.
d. $19,000 for each of 10 years.
e. $6,500 next year and increasing thereafter by 5 percent a year forever.

If the interest rate is 12 percent, which is the most valuable prize?

Question 3

Your company has identified two projects, B and C. Each will require a $5 million outlay immediately. Unfortunately, the net cash flow from the two projects will be sensitive to the growth rate of the world economy. Assume the three outcomes for the economy are equally likely.

Project	Slump	Normal	Boom
B	4	6	8
C	5	5.5	6

You have identified the possible payoffs (stock price + dividends at year 1) to investors in three stocks, X, Y, and Z:

Stock	Current Share Price	Slump	Normal	Boom
X	95.65	80	110	140
Y	40	40	44	48
Z	10	8	12	16

a. What are the expected cash inflows of projects B and C?
b. What are the expected rates of return offered by stocks, X, Y, and Z?

c. What are the opportunity costs of capital for projects B and C? Hint: Calculate the percentage differences, slump versus normal and boom versus normal, for stocks X, Y, and Z. Match up the percentage differences in B's and C's payoffs
d. What are the NPVs of projects B and C?
e. Suppose B and C are launched and $5 million are invested in each. How much will they add to the total market value of your company's shares?

Question 4

Mike Polanski is 30 years of age and his salary next year will be $40,000. Mike forecasts that his salary will increase at the steady rate of 5 percent per annum until his retirement at age 60.

a. If the discount rate is 8 percent, what is the PV of these future salary payments?
b. If Mike saves 5 percent of his salary each year and invests these savings at an interest rate of 8 percent, how much will he have saved by age 60?
c. If Mike plans to spend these savings in even amounts over the subsequent 20 years, how much can he spend each year?

Question 5

Vernal Pool, a self-employed herpetologist, wants to put aside a fixed fraction of her annual income as savings for retirement. Ms. Pool is now 40 years old and makes $40,000 a year. She expects her income to increase by 2 percentage points over inflation (e.g., 4 percent inflation means a 6 percent increase in income). She wants to accumulate $500,000 in real terms to retire at age 70. What fraction of her income does she need to set aside? Assume her retirement funds are conservatively invested at an expected real rate of return of 5 percent a year. Ignore taxes.