

Notes: 1) “Annuity” and “perpetuity” may have growing or constant cash flows. 2) While you are welcome to solve any problem to a final answer, you will only earn points for setting them up. “Setting up” means writing down the appropriate equations and plugging in the appropriate numbers. For multistep problems, you can plug unsolved variables into later steps. Note however, that some problems will require some calculations for you to figure out how to solve them.

Short Answer (15 points each)

1. Assume you have just sold short shares of Kellogg. What cash flows did your transaction create? What future cash flows can you expect as a result of today’s transaction?
2. Assume that an account pays an APR of 7.5% per year with quarterly compounding. What is the effective semi-annual interest rate on this account?
3. Assume that two annuities have the same present value and the cash flows are growing at the same rate. However, the required return (cost of capital) is lower for Annuity A than for Annuity B. How does the initial cash flow for Annuity A compare to the initial cash flow for Annuity B?
4. Your boss just came into your office to tell you that by mistake he had included an extra \$5000 of depreciation in the third year of a project you are analyzing. How will fixing this error affect the profits and cash flows associated with the project?
5. Assume that you the beta of a stock is greater than one. What does this tell you about the stock?
6. Assume you own a portfolio with long positions in two stocks. If the correlation between the two stocks falls, what has happened to the volatility (standard deviation) of your portfolio?
7. Assume that the bid price for a Proctor & Gamble call with a \$65 strike price is \$1.27 and the ask price for this call is \$1.32. If you buy this call (create a long call) what is your overall profit or loss if Proctor & Gamble’s stock price ends up at \$70.
8. Assume perfect capital markets and that Amazon Taxes increases its leverage. How does the beta of Amazon Taxes’ stock change? Why are stockholders indifferent to this change?
9. Management typically knows more about a firm than outside investors. How should stock prices react to an announcement by the firm that the firm plans to issue equity as a result of this difference?
10. What transactions involving a call are required to duplicate the payoff on a firm’s risky bonds? Be specific.

Problems (75 points each)

1. Assume: Ford’s stock price equals \$11.59 per share, the price of a call on Ford with an \$11 strike price that expires three months from today equals \$1.25, the price of a put on Ford with an \$11 strike price that expires three months from today equals \$0.39, and the return on a three-month Treasury equals 0.096% per year.
 - a. What set of transactions today will generate an arbitrage profit? What is this profit?
 - b. Show that the conditions of arbitrage are met if Ford’s stock price ends up at \$16 and if Ford’s stock price ends up at \$8

2. Sketch a graph of the best possible combinations of risk and return you can create from buying or shorting Treasuries, Avon, and Chesapeake Energy. Be sure to label which part of your graph is optimal.

Expected Returns: Treasuries = 1%, Avon = 5%, Chesapeake = 12%

Standard deviation of returns: Avon = 36%, Chesapeake = 47%

Correlation between Avon and Chesapeake = +0.17

Use the following information to answer questions 3 and 4.

Amazon is considering whether to build a new distribution center in Nebraska.

The distribution center will cost \$5,000,000 to build and will begin generating monthly cash flows six months from today that will continue through five years from today. The first cash flow will equal \$100,000 and cash flows grow by 0.4% per month.

If sales exceed expectations, the distribution center can be expanded any time over the next two years at a cost of \$2,500,000. The expansion would generate expected cash flows equal to \$150,000 each month beginning one month after the expansion occurs and ending five years from today. However, if sales fail to materialize, the facility can be sold any time over the next year for \$3,500,000.

The standard deviation of returns on the distribution center is expected to equal 35%. This exceeds the standard deviation of returns on Amazon as a whole which equals 25%, but is less than the standard deviation of returns on the expansion which equals 45%.

The beta of the factory and the expansion will equal 0.7. This exceeds the beta of Amazon as a whole which equals 0.5.

The market is expected to earn 8% per year and the annualized returns on Treasuries vary by maturity as follows:

1-month = 0.012%; 2-months = 0.065%; 3-months = 0.079%; 4-months = 0.094%; 5-months = 0.117%;
6-months = 0.153%; 1-year = 0.187%; 2-years = 0.254%; 3-years = 0.402%; 4-years = 0.593%;
5-years = 0.821%

3. Set up the calculations needed to determine the net present value of the facility excluding any options associated with it.
4. Set up the calculations needed to determine how the possibility of expanding the distribution facility affects the value of the facility.
5. Assume that the tax rate on corporate income equals 20%, on personal equity income equals 10%, and on interest income equals 25%. Assume also that there is a 45% chance that Cantaloupe Computers will earn \$200,000, a 30% chance that Cantaloupe will earn \$500,000, and a 25% chance that Cantaloupe will earn \$900,000. Determine (rather than just set up the calculations to determine) Cantaloupe's optimal level of debt.
6. Under what conditions might a firm's stockholders and managers disagree over whether a firm should invest in a project? How can a firm's capital structure help to resolve these potential conflicts?