

Note: For all problems requiring calculations, you will only earn points for setting up solutions. You will not earn any points for calculating or solving anything. "Setting up solutions" means writing down the appropriate equation or equations and plugging in as many numbers as possible. For later steps in multi-step problems, you can plug in unsolved variables...variables you have set up to solve but have not actually solved.

Example: $X = (2 + 3)^{3.5}$; $Y = X/7.31$.

Short Answer (15 points each)

Note: if you write more than a couple of sentences on a short-answer question, you are likely writing too much.

1. Six months ago you invested \$100,000 in Bank of America (BAC) which had a beta of 1.1 and \$300,000 in FedEx (FDX) which had a beta of 0.8. Today, BAC's beta has risen to 1.3 and the market value of your investment has fallen to \$47,000 and FDX's beta has fallen to 0.6 and the market value of your investment in FDX has fallen to \$240,000. Calculate the current beta of your portfolio?
2. You like risk and plan to borrow an amount equal to 50% of your initial wealth (you borrow \$0.50 for every \$1 you start with) and invest all of your funds (initial and borrowed) in risky assets. Your brother, on the other hand, is very risk averse and plans to invest 90% of his money in T-bills and the rest in risky assets. Sketch a graph of the possible combinations of expected return and risk that investors can achieve and identify the expected return on your portfolio and that of your brother if T-bills earn 3% and investors can borrow at 5%.
3. In general, managers know more about the value of a firm's assets and equity than do the firm's stockholders. What does this imply about how stock prices will react to a firm's decision to issue common stock?
4. With perfect capital markets, financial transactions neither create nor destroy value, but simply repackage risk and return. As a result, what are the two basic possibilities if a financial transaction appears to create value? How do you tell a difference between the two?
- X 5. What must be true in order for a firm to gain a tax benefit from having debt in its capital structure?
6. Briefly explain why in perfect capital markets the expected return on a firm's stock increases as the firm's leverage increases.
- ✓ 7. Assume you buy a call on GM with a strike (exercise) price of \$5 that expires in January 2009. Given the following information, calculate your profit or loss (assuming a 0% interest rate) from buying two call contracts if GM's stock price rises from its current \$4.08 per share to \$5.75 per share on January 16 (when the option expires).

Expiration	Strike	Bid	Ask
Dec 08	4	.70	.75
Dec 08	5	.40	.43
Jan 09	4	.92	.95
Jan 09	5	.61	.66
Mar 09	4	1.13	1.23
Mar 09	5	0.91	0.98
8. If nothing else changes, what happens to the value of an American option as it approaches expiration?
- 122 9. When you take out a mortgage on a house, what type of option do you receive from your lender? Be sure to tell what kind of option and whether you have a long or short position in the option.
10. You are considering buying puts on Citigroup that expire in January. If Citigroup's stock price is currently \$7.75 per share, should you expect the most volatile return on a put with a strike price of \$2.50, \$5.00, \$7.50, \$10.00, or \$12.50?

Problems (75 points each)

1. Assume that Firm A's stock is owned by a single individual who is also CEO of the firm. Assume that firm B's stock is owned by thousands of investors and that the CEO and other top managers own a small percent of the firm's equity.
 - a. Explain how you would expect the capital budgeting decisions to differ between the firms.
 - b. Explain how you would expect the capital structure of the two firms to differ.
2. TexEx is considering building a new distribution center in Waco at a cost of \$2 million. The distribution center will allow TexEx to deliver packages to Dallas/Ft. Worth, Austin, Abilene, and Tyler. TexEx estimates that building the distribution center will generate incremental net cash flows over the next 15 years with a present value today of \$2.2 million. If sales are less than expected, TexEx estimates that it can sell the distribution center for \$1.1 million three years from today. The present value of cash flows prior to this potential sale equal \$300,000 of the \$2.2 million total. TexEx estimates that the cost of capital for the distribution center is 14%. The volatility of returns on the distribution center equals 44%. The risk-free rate varies by maturity as follows: 1-year = 1%, 2-year = 2%, 3-year = 2.9%, 4-year = 3.1%, 5-year = 3.3%, 10-year = 5.6%, and 15 year = 6.1%. Calculate the value of building this distribution center.

- X 3. Given a covariance between the returns on Motorola (MOT) and Kellogg (K) of +717 and the following returns, calculate the correlation between the returns on Motorola and Kellogg and the standard deviation (volatility) you can expect if you build a portfolio by investing \$50,000 in Motorola and short-selling \$10,000 of Kellogg.

Return on:		
Year	MOT	K
2008	-72%	-18%
2007	-27%	11%
2006	17%	16%
2005	43%	15%

4. Your firm is considering spending \$4,000,000 to build a new factory to build netbook computers. At the end of the factory's life 4 years and 5 months from today, environmental clean-up costs are expected to equal the proceeds of selling the factory and machinery. Not included in these figures is a required investment in net working capital of \$500,000. Net working capital is not expected to change over the life of the project but will fall to \$0 at the end of the factory's life. The factory's first net after-tax cash flows is expected to equal \$300,000 eight months from today. After this initial cash flow, quarterly cash flows are expected to grow by 1% per quarter through the plant's closing. Should the factory be built if it has a beta of 1.1, the risk-free rate is 2%, and the market risk premium is 9%?

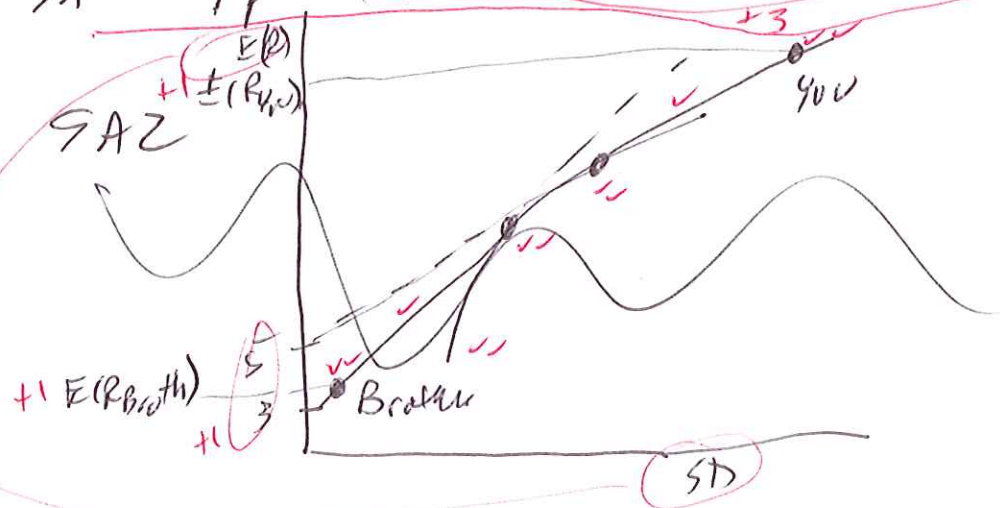
- SA
calc
Hewitt by
current of
diff in
interest
\$6,000,000
5. Assume that the corporate tax rate is 40%, that the personal tax rate on interest income is 30%, and that the personal tax rate on equity income is 20%. Assume also that there is a 15% chance that ST&T will have an EBIT of \$3,000,000, a 35% chance that ST&T will have an EBIT of \$5,000,000, and a 50% chance that ST&T will have an EBIT of \$7,000,000. What level of interest provides ST&T with the greatest tax benefit?

Note: I highly recommend that you do some actual calculations to answer this question. Otherwise you'll need to set up all the relevant calculations and then discuss how you would use these calculations to determine ST&T's optimal capital structure.

6. Hewitt Packing (HP) has a current market price of \$25 per share. In each of the next two years, HP's stock price will either increase by \$5 per share or decrease by \$3 per share. Calculate the value today of a put with a strike price of \$30 if the risk-free rate is 2% and is not expected to change.

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SA1 $\beta_p = \left(\frac{47}{47+240} \right) (1.3) + \left(\frac{240}{47+240} \right) (0.6)$



SA3 call

SA4 ~~must identify market imperfections~~

SA5 must have enough savings to deduct the interest

SA6 will be able to borrow at rate c expected return on assets

SA7 $2(100)(5.75 - 5 - .66)$

SA8 ↓

SA9 long put call

SA10 2.50

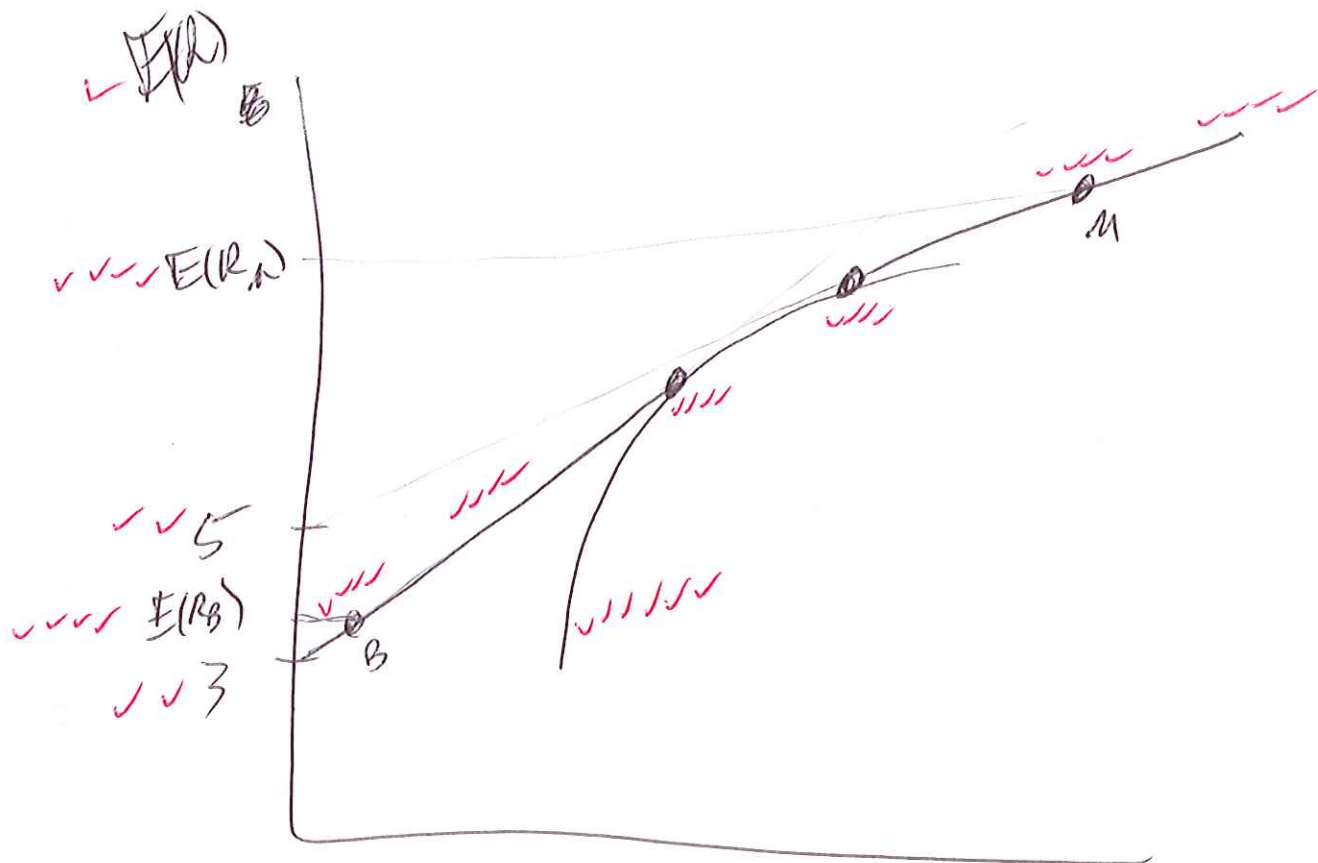
SA4 ✓ 1) efficiency market imperfection

✓ 2) too good to be true

+7/+5/+3 → must identify the source of inefficiency

✓ → must identify the market imperfection that is the source of value

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SAZ



44 = 15
36 = 14
34
32 = 13
30
28 = 12
27
- 24 = 11
22

20 = 10
16 = 9
14
6 = 8
2 = 5

58
✓

(44)

5300

PE 1

$$47 = 75$$

$$76 = 73$$

$$21 = 71$$

$$20 = 70$$

$$16 = 68$$

$$13 = 66$$

$$12 = 65$$

$$8 = 63$$

$$7 = 62$$

$$-6 = 60$$

$$4 = 57$$

$$2 = 52$$

$$1 = 45$$

a. Firm B is more likely to invest in projects that $\uparrow$ size of the firm even if ~~the~~ negative NPV

$\Rightarrow$ mgt benefits from larger firm even if doesn't help S/H

$\Rightarrow \uparrow$ pay, power, perks, prestige

Firm B will likely be more likely to invest in projects that diversify the firm

$\Rightarrow$ management benefits since not diversified

$\Rightarrow$ management at firm A will consider the cost of diversification while management at firm B may not.

$\Rightarrow$ Firm B S/H indifferent to diversification but not the cost.

b. Firm B may have more debt since helps (resolves S/H-mgt conflict)

$\Rightarrow$ (cash used for debt service) so (mgt won't waste it)

$\Rightarrow$ creditors help monitor management

$\Rightarrow$ (threat of bankruptcy) pushes management to (work harder)

Note: management may resist debt since don't like the discipline.

Firm B may have more debt as management uses debt to signal their confidence in the firm

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$$2. \times 3 \left(NPV = 2.2 - 2 \right)^{+5} \quad (13)$$

$$\times 6 \left(d_1 = \frac{\ln\left(\frac{S}{PVC}\right)}{.44\sqrt{3}} + \frac{.44\sqrt{3}}{2} \right)^{+4} \quad (15)$$

$$\times 6 \left(d_2 = d_1 - .44\sqrt{3} \right)^{+5} \quad (16)$$

$$\times 6 \left(P = PVC(1 - N(d_2)) - S(1 - N(d_1)) \right)^{+5} \quad (17)$$

$$\times 6 \left(PVC = \frac{1.1}{(1.079)^3} \right)^{+4} \quad (20)$$

$$\times 6 \left(SX = 2.2 - \cancel{.3} \right)^{+5} \quad (11)$$

$$\times 3 \left(\text{value} = NPV + P \right)^{+5} \quad (3)$$

+1 $N()$ = cumulative normal distribution table

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$$3 \cdot 18 \left(SD(R_p) = \sqrt{X_{MOT}^2 SD(R_{MOT})^2 + X_K^2 SD(R_K)^2 + 2 X_{MOT} X_K \text{corr}(R_M, R_K) \frac{SD_K}{SD_M}} \right)$$

$$15 \left(X_{MOT} = \frac{SD}{SD - 10}, X_K = \frac{-10}{SD - 10} \right) \quad (17)$$

$$14 \left(SD(R_{MOT}) = \sqrt{\frac{(-72 - \bar{R}_M)^2 + (-27 - \bar{R}_M)^2 + (17 - \bar{R}_M)^2 + (43 - \bar{R}_M)^2}{3}} \right) \quad (10)$$

$$14 \left(SD(R_K) = \sqrt{\frac{(-18 - \bar{R}_K)^2 + (11 - \bar{R}_K)^2 + (16 - \bar{R}_K)^2 + (15 - \bar{R}_K)^2}{3}} \right)$$

$$18 \left(\text{corr}(R_M, R_K) = \frac{\text{cov}(R_M, R_K)}{SD(R_M) SD(R_K)} \right)$$

$$\text{cov}(R_M, R_K) = -6717$$

$$14 \left(\bar{R}_M = \frac{-72 - 27 + 17 + 43}{4} \right) \quad (10)$$

$$14 \left(\bar{R}_K = \frac{-18 + 11 + 16 + 15}{4} \right) \quad (10)$$

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4. $CFO = -4,000,000 - 500,000$

Inflows
 $+7/ PV_5 = \left(\frac{300,000}{(1.04)^5 - 0.01} \right) \left(1 - \left(\frac{1.01}{1.04} \right)^5 \right)$ (15)

$PV_0 = \frac{PV_5}{(1+r)^{5.2}} + \frac{500,000 + 4}{(1+r)^{4.5+4}}$

$+7/ r = .02 + 1.1 (.09)$ (3)

$+7/ r(1.04) = (1.04)^4 - 1$ (17)

$+1 NPV = PV_0 + CFO$

$+1 \Rightarrow \text{hard to say } > 0$

5. 0-3 $E(T_c) = 0.4$
 $+22/ \tau^A = 1 - \frac{(1-.4)(1-.2)}{1-.3} = 202857.31428$

3-5 $E(T_c) = .85(.4) = .34$
 $\tau^A = 1 - \frac{(1-.78)(1-.2)}{(1-.3)} = .2457143$

5-7 $E(T_c) = .5(.4) = .2$
 $\tau^A = 1 - \frac{(1-.2)(1-.2)}{1-.3} = .0857$

$+11/ 7+$
 $E(T_c) = 0$
 $\tau^A = 1 - \frac{(1-.0)(1-.2)}{(1-.3)} = .14286$

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6. $S = 25$ (3)

$S_u = 25 + 5 = 30$ (6)

$S_d = 25 - 3 = 22$ (9)

$S_{uu} = 25 + 5 + 5 = 35$ (3)

$S_{ud} = S_{du} = 25 + 5 - 3 = 25 - 3 + 5 = 27$ (6)

$S_{dd} = 25 - 3 - 3 = 19$ (3)

$P_{uu} = \max(30 - \overset{S_{uu}}{35}, 0) = \max(30 - 35, 0) = 0$ (3)

$P_{ud} = P_{du} = \max(30 - S_{ud}, 0) = \max(30 - 27, 0) = 3$ (6)

$P_{dd} = \max(30 - S_{dd}, 0) = \max(30 - 19, 0) = 11$ (3)

(42)

+8 $\Delta_u = \frac{P_{uu} - P_{ud}}{S_{uu} - S_{ud}} = \frac{0 - 3}{35 - 27} = -\frac{3}{8}$

+8 $B_u = \frac{P_{ud} - S_{ud} \Delta_u}{1.02} = \frac{3 - 27 \cdot (-\frac{3}{8})}{1.02} = \frac{3 + \frac{81}{8}}{1.02}$

+8 $P_u = S_u \Delta_u + B_u = 30 \Delta_u + B_u$

$\Delta_d = \frac{P_{ud} - P_{dd}}{S_{ud} - S_{dd}} = \frac{3 - 11}{27 - 19} = -1$

$B_d = \frac{P_{dd} - S_{dd} \Delta_d}{1.02} = \frac{11 - 19 \cdot (-1)}{1.02} = \frac{11 + 19}{1.02}$

$P_d = S_d \Delta_d + B_d = 22 \Delta_d + B_d$

$\Delta = \frac{P_u - P_d}{S_u - S_d} = \frac{P_u - P_d}{30 - 22} = \frac{P_u - P_d}{8}$

$B = \frac{P_d - S_d \Delta}{1.02} = \frac{P_d - 22 \Delta}{1.02}$

$P = S \Delta + B = 25 \Delta + B$