

Exam 2-Take Home Portion Fall 2002 FINC 4531 Answer Key

1. a. Maximize the firm's stock price

2 .B. False

3. c. 2.0

4.  $PV = -1158.91$ ,  $N = 10 \times 2 = 20$ ,  $I = 14/2 = 7$ ,  $FV = 1000$ , then  $PMT$  for 6 months = \$85. Thus coupon per year =  $85 \times 2 = 170$ , and coupon rate =  $170/1000 = 17\%$ .

5.  $15 = (1 + g)/(12\% - g) \rightarrow g = 5\%$

6. (2 points) Mack Industries just paid a dividend of \$1.00 per share (i.e.,  $D_0 = \$1.00$ ). Analysts expect the company's dividend to grow 20 percent this year (i.e.,  $D_1 = \$1.20$ ), and 15 percent next year. After two years the dividend is expected to grow at a constant rate of 5 percent. The required rate of return on the company's stock is 12 percent. What should be the current price of the company's stock?

$D_1 = 1.20$ ,  $D_2 = 1.38$ ,  $D_3 = 1.449$ . Sell stock as soon as growth becomes constant, thus  $P_2 = D_3 / (r_s - g) = 1.449 / (12\% - 5\%) = \$20.70$ . Then take the NPV at 12% of the expected dividends and selling price,  $C_0 = 0$ ,  $C_1 = 1.20$ ,  $C_2 = 1.38 + 20.70$ . Stock Price = \$18.673

7. What is the optimal dividend structure? Why?

Long Run Residual policy as it assures that all positive NPV projects are accepted while making sure that dividends are relatively stable to avoid sending incorrect signals to the market by making frequent changes to the firm's dividends.

8. b. False, since management decides on the amount of debt in the capital structure.

9. a. True

10. A. True

11. (2 points) Match the term with the date:

Record Date	___D_____	a. April 26, 2001
Payment Date	___C_____	b. May 12, 2001
Ex-Dividend Date	___B_____	c. June 7, 2001
Declaration Date	___A_____	d. May 15, 2001

12. This question covers a topic that will not be tested in this class.

12. (Point values are as listed) Use the following information for the next several questions. Consider a world of perfect capital markets. This world has no corporate or personal taxes, all investors have homogeneous expectations, no bankruptcy costs, and M&M's no-tax theory of capital structure is true.

Company Y is financed has the following market value balance sheet:

Assets = \$ 291	Liabilities = \$81
	Equity = \$210

The firm had \$25 in EBIT last year. The firm has 30 shares outstanding. The firm expects this same return for the foreseeable future. The firm is a zero growth firm, that pays out all excess earnings as dividends. Any time the firm changes its capital structure, it changes only the

debt/equity mix and does not change its total assets. The firm's liabilities consists entirely of perpetual debt. The firm's debt is risk-less, perpetual, selling at par, and has a 5% yield. If the firm were to change its capital structure, new debt would still have a 5% yield. The expected return on the market is 14%. Given this information, answer the following questions:

a. (2 points) What is the firm's return on equity?

Create an income statement,

EBIT (25) – Interest Expense (81\*5%=4.05)= EBT (20.95) – Taxes (0)=Net Income (20.95)

Rs=ROE = 20.95/210=9.98% about 10%

b. (2 points) What is the firm's current weighted average cost of capital.

Two ways, easy way look at return on assets, 25/291 = 8.59%

Harder way, compute WACC= (wd\*rd\*(1-t)) + (ws\*rs) (81/291\*5%) + (210/291\*9.98%)=1.39+7.20=8.59%

c. (2 points) What is the current price per share?

210/30=\$7.00

d. (2 points) What is the beta of the firm's equity?

9.98 = 5 + (Beta \*(14-5)) → beta = .55

Now assume that the above firm issues enough equity to repurchase all of the firm's debt. This change in capital structure reveals no new information about future firm prospects.

e. (2 points) What is the overall firm's new WACC?

By theory there is no change, thus still 8.59%

f. (2 points) Write out the firm's new balance sheet.

Assets (291) = Liabilities (0) + Equity (291)

g. (Fill in the blank with one of the suggested answers, 1 points each) Now assume the firm issued an additional \$200 in debt and used the funds to repurchase equity. Under this scenario, the required rate of return on the equity would \_\_\_\_\_ higher \_\_\_\_\_ (be lower/be higher/be unchanged), while the overall WACC of the firm would \_\_\_unchanged\_\_\_\_\_ (be lower/be higher/be unchanged).

13. Now consider a DIFFERENT COMPANY in a world that of perfect capital markets, with one change, CORPORATE TAXES DO EXIST. This world has no personal taxes, all investors have homogeneous expectations, no bankruptcy costs, and M&M's with corporate taxes theory of capital structure is true. Company Y is financed has the following market value balance sheet:

Assets = \$ 180

Liabilities = \$0

Equity = \$180

The firm had \$30 in EBIT last year. The firm has 20 shares outstanding. The firm expects the same return/profits for the foreseeable future. The firm a is a zero growth firm, that pays out all excess earnings as dividends. Any time the firm changes its capital structure, it changes only the debt/equity mix and does not change its total assets. Liabilities consist only of the firm's debt. The debt is riskless, perpetual, selling at par, and has a 8% pre-tax yield. If the firm were to change its capital structure, new debt would still have a 8% pre-tax yield. The firm's tax rate is 40%. Given this information, answer the following questions:

a. (2 points) What is the current expected return on the firm's equity?

Create an income statement, EBIT (30) – Interest Expense (0) =EBT (30) – Taxes (30\*40%=12) =Net Income (18)

b. (2 points) What is the firm's current dividends per share?

$$18/20 = \$0.90$$

Now assume the firm issues \$50 in debt and repurchases \$50 in equity.

c. (2 points) Write out the firm's new balance sheet after all of the changes.

Note the firm will increase in value by the amount of the tax shield from part B, since  
Value of the Levered Firm = Value of the Unlevered Firm + Present Value of the Tax Shield.

$$\text{Thus Assets (200)} = \text{Liabilities (50)} + \text{Equity (150)}$$

d. (2 points) What is the value of the firm's tax shield due to the use of perpetual debt?

$$T^*D = 40\% * 50 = 20$$

e. (2 points) What is the firm's Weighted Average Cost of Capital?

Create an income statement, EBIT (30) – Interest (50\*8%=4) = EBT (26) – Taxes  
(26\*40%=10.40) = Net Income (15.60).

$$R_s = ROE = 15.6/150 = 10.4\%$$

$$\text{Thus WACC} = (w_d * r_d * (1-t)) + (w_s * r_s) = (50/200 * 8\% * (1-40)) + (150/200 * 10.4) = 1.2 + 7.8 = 9\%$$

Note the shortcut method is equation 15.6 on page 449. To use this you must find the unlevered WACC which is  $18/180 = 10\%$ . Thus the levered WACC =  $10\% * (1 - (40\% * 25\%)) = 9\%$ .

14. (6 points) Rolling Corporation is constructing its Cost of Capital schedule. The firm is at its target capital structure. Its bonds have a 8 percent coupon, paid semiannually, a current maturity of 13 years, and sell for \$1,037.40. Rolling's beta is 1.3, the risk-free rate is 5.4 percent, and the market risk premium is 6.5 percent. Rolling is a constant growth firm, which just paid a dividend of \$1.35, sells for \$25.00 per share, and has a growth rate of 10 percent.

The firm's book value balance sheet is as follows:

Asset	\$25,700	Long Term Debt	\$13,000
		Equity (\$50 par)	\$1,800
		Retained Earnings	\$10,900

a. What is the firm's leverage ratio?

First convert the balance sheet from book value to market value, Debt (Book Value/par value \* Market Value =  $13000/1000 * 1037.4 = 13486.2$ ) + Equity (Stock Price \* Number of Shares (=Equity/par value) =  $25 * 1800 / .5 = 90000$ ) giving market value of assets =  $13486.2 + 90000 = 103486.2$ .

$$\text{Leverage ratio} = \text{debt} / \text{assets} = 13486 / 103486 = 13.0\%$$

b. What is Rolling's cost of debt%?

$PV = -1037.4, FV = 1000, N = 13 * 2 = 26, PMT = 80/2 = 40$ , giving  $I = 3.77$  for six months,  $3.77 * 2 = 7.54\%$  pretax

c. What is Rolling's cost of retained earnings using the Discounted Cash Flow approach?

$$D1/P0 + g = (1.35 * (1+10\%)/25) + 10\% = 15.94\%$$

d. What is Rolling's cost of retained earnings using the Capital Asset Pricing Model approach?

$R_f + (\text{Beta} * \text{market Risk premium}) = 5.4 + (1.3 * 6.5) = 13.85\%$ , note you were given the market risk premium not the return on the market in this problem.

e. Since the cost of Retained Earnings differs with the two above approaches, what should you use as the cost of retained earnings? Explain your choice?

If you use the high number you will raise the WACC and therefore lower the calculated NPVs. If you use the low number, you will lower the WACC and therefore raise the calculated NPVs. Since our job is to maximize shareholder's wealth, and the way to do this is to accept positive NPV projects and to reject all negative NPV projects, we need to have the correct NPV not a biased NPV. Therefore, you should use the cost of equity that you regard as the most likely to be correct, as the purpose of estimating the WACC is to determine the return that is expected by our investors.

f. Using your DCF estimate of the cost of retained earnings, what is Rolling' WACC?  
 $(13\% * 7.54\% * (1 - \text{tax rate})) + (87\% * 15.94\%) = .98 + 13.86 = 14.85\%$