FINA1082 – FINANCIAL MANAGEMENT

Capital Structure I

Tutorial for Lecture 15

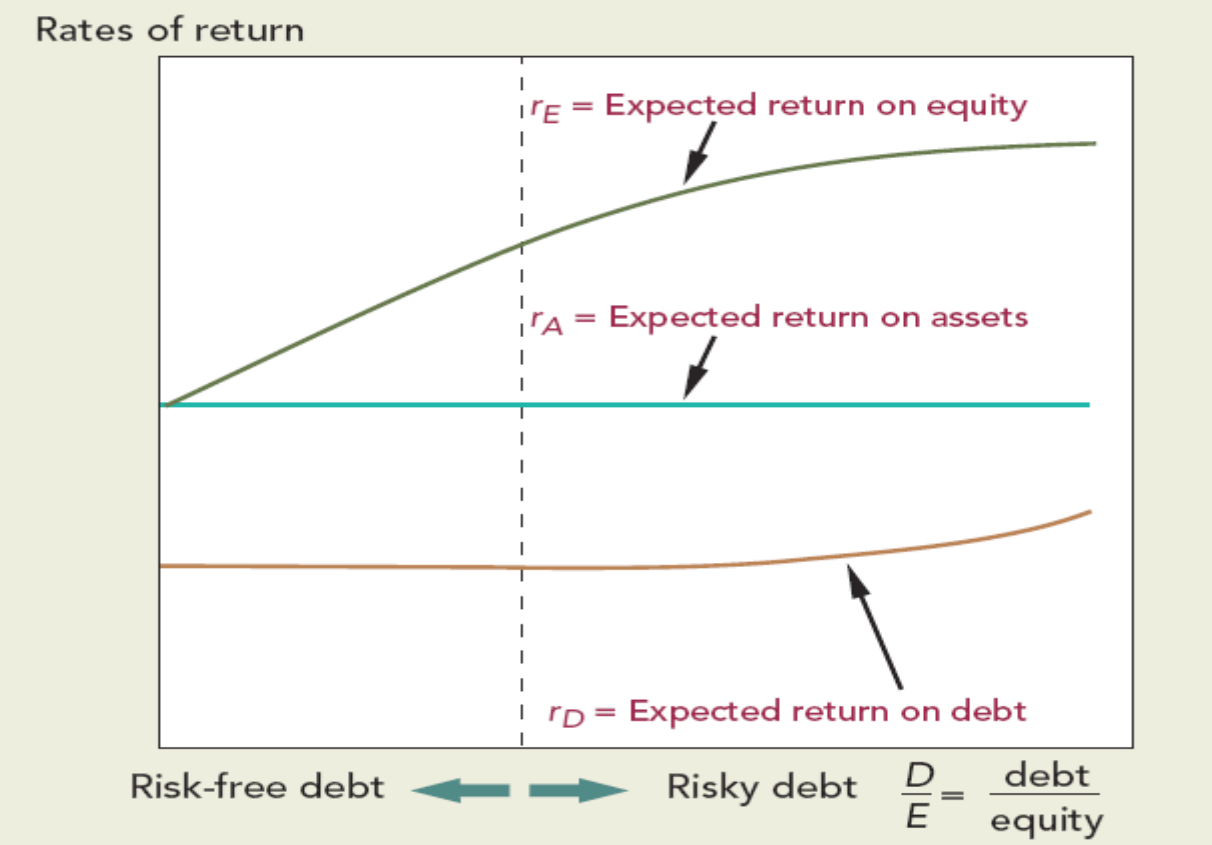
A. Short Answer Questions

A1. Chapter 17 Question 14 of BMA 10Edition

"MM totally ignore the fact that as you borrow more, you have to pay higher rates of interest." Explain carefully whether this is a valid objection.

This is not a valid objection. MM's Proposition II explicitly allows for the rates of return for both debt and equity to increase as the proportion of debt in the capital structure increases. The rate for debt increases because the debt-holders are taking on more of the risk of the firm; the rate for common stock increases because of increasing financial leverage.

MM Proposition II assumes that the firm's bonds are risk-free at low debt levels (up to the dashed vertical line in graph below). Therefore the r_E increases linearly with D/E until a point when the slope tapers off. Also, the debt return is constant up to the dashed line in graph where it rises because of the increased risk from extremely high debt. Notice that while the return on debt increases after the dashed line, the return on equity reduces its rising momentum. This is for the reason that debt holders are taking on the extra risk of additional debt at the advantage of shareholders.



B. Problems

B1. Chapter 17 Question 1 of BMA 10Edition

Ms. Kraft owns 50,000 shares of the common stock of Copperhead Corporation with a market value of $2 per share, or $100,000 overall. The company is currently financed as follows:

	Book Value
Common stock (8 million shares)	$2 million
Short-term loans	$2 million

Copperhead now announces that it is replacing $1 million of short-term debt with an issue of common stock. What action can Ms. Kraft take to ensure that she is entitled to exactly the same proportion of profit as before?

Note the market value of Copperhead is far in excess of its book value:

	Market Value
Common stock (8 million shares at $2)	$16,000,000
Short-term loans	$ 2,000,000

Ms. Kraft owns 50,000 shares out of the 8 million shares which equates to 0.625% of the firm.

The company proposes to increase common stock by $1 million to $17 million and cut short-term debt.

Ms. Kraft can offset this by (a) borrowing .00625 X 1,000,000 = $6,250, and (b) buying that much more Copperhead stock so that she does not lose control of her holding of the firm.

B2. Chapter 17 Question 3 of BMA 10Edition

The common stock and debt of Northern Sludge are valued at $50 million and $30 million, respectively. Investors currently require a 16% return on the common stock and an 8% return on the debt. If Northern Sludge issues an additional $10 million of common stock and uses this money to retire debt, what happens to the expected return on the stock? Assume that the change in capital structure does not affect the risk of the debt and that there are no taxes.

Expected return on assets is

$$r_A = r_D(1-T_C)\frac{D}{V} + r_E\frac{E}{V}$$

D=$30m, E=$50m, V=D+E = $30m+$50m = $80m

T_C=0 , r_D=0.08, r_E=0.16

If we ignore taxes, the return on assets will be the same for any capital structure mix considered.

r_A = .08 X 30/80 + .16 X 50/80 = .13. or 13%

$$r_E = r_A + (r_A - r_D)\frac{D}{E}$$

With an additional $10m of common stock, E=$60m and D=$20m there's a change in capital structure.

The new return on equity will be r_E = .13 + (20/60)(.13 - .08) = .147. or <u>14.7%</u>

B3. Chapter 17 Question 8 of BMA 10Edition

Gaucho Services starts life with all-equity financing and a cost of equity of 14%. Suppose it refinances to the following market-value capital structure:

Debt (D)	45%	at r_D=9.5%
Equity (E)	55%	

Use MM's proposition 2 to calculate the new cost of equity. Gaucho pays taxes at a marginal rate of Tc =40%. Calculate Gaucho's after-tax weighted-average cost of capital.

First we assume no taxes exist so as to work out the return on equity given that the return on assets does not change with changing debt levels:

Currently r_A = r_E = .14, or 14%. From proposition 2 the leverage causes r_E to increase to r_E = r_A + (r_A – r_D)(D/E) = .14 + (.14 - .095) X (45/55) = .1768, or <u>17.68%</u>

After-tax WACC formula:

After-tax WACC = .095 X (1 - .40) X .45 + .1768 X .55 = .1229, or 12.29%.

B4. Chapter 17 Question 12 of BMA 10Edition

Executive Chalk is financed solely by common stock and has outstanding 25 million shares with a market price of $10 a share. It now announces that it intends to issue $160 million of debt and to use the proceeds to buy back common stock.

a. How is the market price of the stock affected by the announcement?

According to MM's first proposition, the share price will not change by a change in capital structure given that the value of the firm is determined by its real assets.

b. How many shares can the company buy back with the $160 million of new debt that it issues?

$160 million / $10 per share $= \underline{\$16 \text{ million shares}}$ in share repurchase.

c. What is the market value of the firm (equity plus debt) after the change in capital structure?

After the change in capital structure, the market value of the firm is unchanged as argued by MM's first proposition (in a world of no taxes).

Equity + Debt = $250 million

d. What is the debt ratio after the change in structure?

Debt/(Debt + Equity) = $160 million/$250 million = $\underline{0.64}$

e. Who (if anyone) gains or loses?

According to Modigliani and Miller's first proposition there's no change in value due to changing the capital structure therefore we do not expect any gains or loses.

B5. Chapter 17 Question 13 of BMA 10Edition

Hubbard's Pet Foods is financed 80% by common stock and 20% by bonds. The expected return on the common stock is 12% and the rate of interest on the bonds is 6%. Assuming that the bonds are default-risk free, draw a graph that shows the expected return of Hubbard's common stock (r_E) and the expected return on the package of cmmon stock and bonds (r_A) for different debt-equity ratios.

The company cost of capital is:

$$r_A = (0.8 \times 0.12) + (0.2 \times 0.06) = 0.108 = 10.8\%$$

Under Proposition I, this is unaffected by capital structure changes. With the bonds remaining at the 6% default-risk free rate, we have:

r_D and r_A will remain constant with changing capital structure and therefore is represented by a horizontal line. On the other hand, r_E will change with changing capital structure as follows:-

$$r_E = r_A + (r_A - r_D)\frac{D}{E}$$

For D/E = 0, $r_E = 10.8 + (10.8 - 6)*0 = 10.8\%$

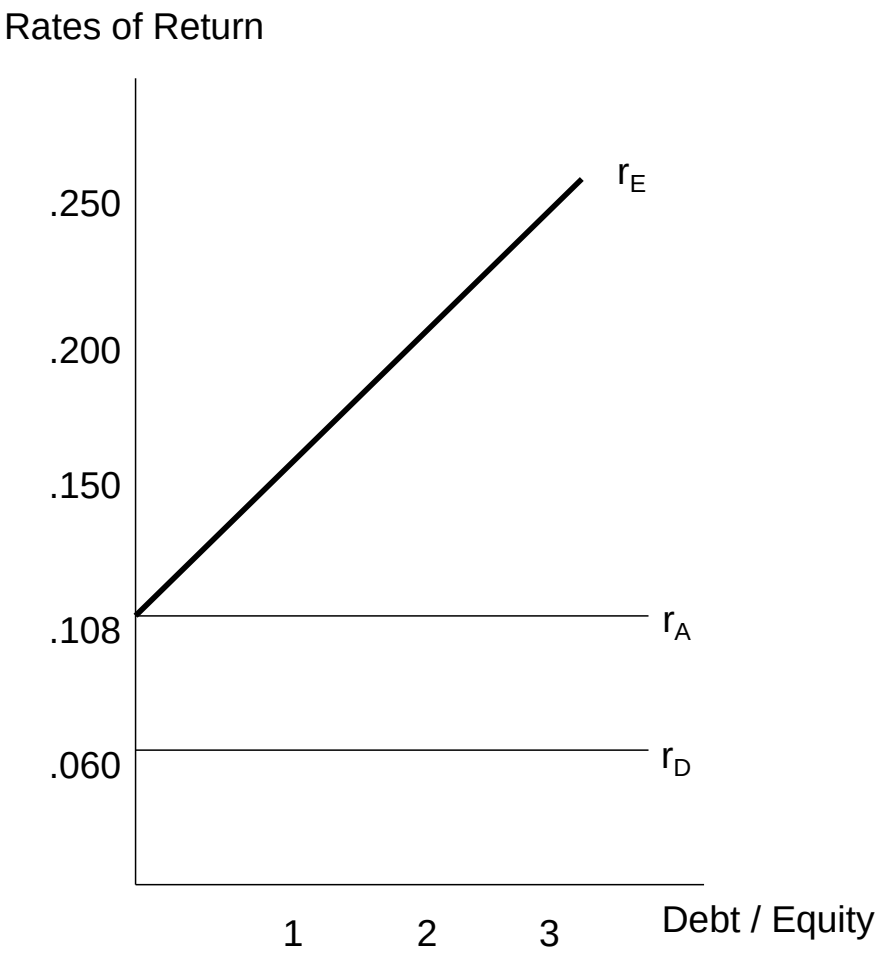
For D/E =0.5, $r_E = 10.8 + (10.8 - 6)*(0.5) = 13.2\%$

For D/E =1, $r_E = 10.8 + (10.8 - 6)*1 = 15.6\%$

For D/E =2, $r_E = 10.8 + (10.8 - 6)*2 = 20.4\%$

For D/E =3, $r_E = 10.8 + (10.8 - 6)*3 = 25.2\%$

Debt-Equity Ratio	r_E	r_A
0.00	0.108	0.108
0.10	0.113	0.108
0.50	0.132	0.108
1.00	0.156	0.108
2.00	0.204	0.108
3.00	0.252	0.108


Rates of Return
.250
.200
.150
.108
.060
r_E
r_A
r_D
1
2
3
Debt / Equity