Financial Management

FINA 2010, Semester II, 2020-2021

Assignment 10 (Solution)

12 April, 2021

1. Questions from Chapter 16 of the text book (Page 567, Concepts Review and Critical Thinking Questions)

Q1: Business risk is the equity risk arising from the nature of the firm's operating activity and is directly related to the systematic risk of the firm's assets. Financial risk is the equity risk that is due entirely to the firm's chosen capital structure. As financial leverage, or the use of debt financing, increases, so does financial risk and, hence, the overall risk of the equity. Thus, Firm B could have a higher cost of equity if it uses greater leverage.

Q3: Because many relevant factors such as bankruptcy costs, tax asymmetries, and agency costs cannot easily be identified or quantified, it's practically impossible to determine the precise debt-equity ratio that maximizes the value of the firm. However, if the firm's cost of new debt suddenly becomes much more expensive, it's probably true that the firm is too highly leveraged.

2. Questions from Chapter 16 of the text book (Page 568, Questions and Problems)

Q4: *a.* Under Plan I, the unlevered company, net income is the same as EBIT with no corporate tax. The EPS under this capitalization will be:
EPS = $400,000/180,000 shares
EPS = $2.22
Under Plan II, the levered company, EBIT will be reduced by the interest payment. The interest payment is the amount of debt times the interest rate, so:
NI = $400,000 – .08($1,925,000)
NI = $246,000
And the EPS will be:
EPS = $246,000/130,000 shares
EPS = $1.89
Plan I has the higher EPS when EBIT is $400,000.

b. Under Plan I, the net income is $600,000 and the EPS is:
EPS = $600,000/180,000 shares
EPS = $3.33
Under Plan II, the net income is:
NI = $600,000 – .08($1,925,000)
NI = $446,000
And the EPS is:
EPS = $446,000/130,000 shares
EPS = $3.43
Plan II has the higher EPS when EBIT is $600,000.

c. To find the break-even EBIT for two different capital structures, we set the equations for EPS equal to each other and solve for EBIT. The break-even EBIT is:
EBIT/180,000 = [EBIT – .08($1,925,000)]/130,000
EBIT = $554,400

Q13: *a.* For an all-equity financed company:
WACC = $R_U = R_E$ = .0940 or 9.40%

b. To find the cost of equity for the company with leverage we need to use M&M Proposition II with taxes, so:
$R_E = R_U + (R_U - R_D)(D/E)(1 - T_C)$
R_E = .094 + (.094 – .061)(.25/.75)(1 – .21)
R_E = .1027, or 10.27%

c. Using M&M Proposition II with taxes again, we get:
$R_E = R_U + (R_U - R_D)(D/E)(1 - T_C)$
R_E = .094 + (.094 – .061)(.50/.50)(1 – .21)
R_E = .1201, or 12.01%

d. The WACC with 25 percent debt is:
WACC = $(E/V)R_E + (D/V)R_D(1 - T_C)$
WACC = .75(.1027) + .25(.061)(1 – .21)
WACC = .0891, or 8.91%
And the WACC with 50 percent debt is:
WACC = $(E/V)R_E + (D/V)R_D(1 - T_C)$
WACC = .50(.1201) + .50(.061)(1 – .21)
WACC = .0841, or 8.41%

Q17: *a.* With no debt, we are finding the value of an unlevered firm, so:

V_U = EBIT$(1 - T_C)/R_0$

V_U = $31,200(1 – .22)/.11

V_U = $221,236.36

b. The general expression for the value of a leveraged firm is:

$V_L = V_U + T_C D$

If debt is 50 percent of V_U, then $D = (.50)V_U$, and we have:

$V_L = V_U + T_C[(.50)V_U]$

V_L = $221,236.36 + .22(.50)($221,236.36)

V_L = $245,572.36

And if debt is 100 percent of V_U, then $D = (1.0)V_U$, and we have:

$V_L = V_U + T_C[(1.0)V_U]$

V_L = \$221,236.36 + .22(1.0)(\$221,236.36)

V_L = \$269,908.36

c. According to M&M Proposition I with taxes:

$V_L = V_U + T_C D$

With debt being 50 percent of the value of the levered firm, D must equal (.50)V_L, so:

$V_L = V_U + T_C[(.50)V_L]$

V_L = \$221,236.36 + .22(.50)(V_L)

V_L = \$248,580.18

If the debt is 100 percent of the levered value, D must equal V_L, so:

$V_L = V_U + T_C[(1.0)V_L]$

V_L = \$221,236.36 + .22(1.0)(V_L)

V_L = \$283,636.36

Q19: M&M Proposition II states:

$R_E = R_U + (R_U - R_D)(D/E)(1 - T_C)$

And the equation for WACC is:

WACC = $(E/V)R_E + (D/V)R_D(1 - T_C)$

Substituting the M&M Proposition II equation into the equation for WACC, we get:

WACC = $(E/V)[R_U + (R_U - R_D)(D/E)(1 - T_C)] + (D/V)R_D(1 - T_C)$

Rearranging and reducing the equation, we get:

WACC = $R_U[(E/V) + (E/V)(D/E)(1 - T_C)] + R_D(1 - T_C)[(D/V) - (E/V)(D/E)]$

WACC = $R_U[(E/V) + (D/V)(1 - T_C)]$

WACC = $R_U[\{(E+D)/V\} - T_C(D/V)]$

WACC = $R_U[1 - T_C(D/V)]$

3. Homemade leverage is:
A. the incurrence of debt by a corporation in order to pay dividends to shareholders.
B. the exclusive use of debt to fund a corporate expansion project.
C. the borrowing or lending of money by individual shareholders as a means of adjusting their level of financial leverage.
D. best defined as an increase in a firm's debt-equity ratio.
E. the term used to describe the capital structure of a levered firm.

4. The costs incurred by a business in an effort to avoid bankruptcy are classified as _____ costs.
A. flotation
B. direct bankruptcy
C. indirect bankruptcy
D. financial solvency
E. capital structure

5. The value of a firm is maximized when the:
A. cost of equity is maximized.
B. tax rate is zero.
C. levered cost of capital is maximized.
D. weighted average cost of capital is minimized.
E. debt-equity ratio is minimized.

6. AA Tours is comparing two capital structures to determine how to best finance its operations. The first option consists of all equity financing. The second option is based on a debt-equity ratio of 0.45. What should AA Tours do if its expected earnings before interest and taxes (EBIT) are less than the break-even level? Assume there are no taxes.
A. select the leverage option because the debt-equity ratio is less than 0.50
B. select the leverage option since the expected EBIT is less than the break-even level
C. select the unlevered option since the debt-equity ratio is less than 0.50
D. select the unlevered option since the expected EBIT is less than the break-even level
E. cannot be determined from the information provided

7. Which one of the following statements is correct concerning the relationship between a levered and an unlevered capital structure? Assume there are no taxes.
A. At the break-even point, there is no advantage to debt.
B. The earnings per share will equal zero when EBIT is zero for a levered firm.
C. The advantages of leverage are inversely related to the level of EBIT.
D. The use of leverage at any level of EBIT increases the EPS.
E. EPS are more sensitive to changes in EBIT when a firm is unlevered.

8. Which one of the following makes the capital structure of a firm irrelevant?
A. taxes
B. interest tax shield
C. 100 percent dividend payout ratio
D. debt-equity ratio that is greater than 0 but less than 1
E. homemade leverage

9. Which of the following statements are correct in relation to M&M Proposition II with no taxes?
I. The required return on assets is equal to the weighted average cost of capital.
II. Financial risk is determined by the debt-equity ratio.
III. Financial risk determines the return on assets.
IV. The cost of equity declines when the amount of leverage used by a firm rises.
A. I and III only
B. II and IV only
C. I and II only
D. III and IV only
E. I and IV only

10. The business risk of a firm:
A. depends on the firm's level of unsystematic risk.
B. is inversely related to the required return on the firm's assets.
C. is dependent upon the relative weights of the debt and equity used to finance the firm.
D. has a positive relationship with the firm's cost of equity.
E. has no relationship with the required return on a firm's assets according to M&M Proposition II.

11. M&M Proposition I with tax supports the theory that:
A. a firm's weighted average cost of capital decreases as the firm's debt-equity ratio increases.
B. the value of a firm is inversely related to the amount of leverage used by the firm.
C. the value of an unlevered firm is equal to the value of a levered firm plus the value of the interest tax shield.
D. a firm's cost of capital is the same regardless of the mix of debt and equity used by the firm.
E. a firm's cost of equity increases as the debt-equity ratio of the firm decreases.

12. Based on M&M Proposition II with taxes, the weighted average cost of capital:
A. is equal to the aftertax cost of debt.
B. has a linear relationship with the cost of equity capital.
C. is unaffected by the tax rate.
D. decreases as the debt-equity ratio increases.
E. is equal to $R_U \times (1 - T_C)$.

13. Which one of the following is a direct bankruptcy cost?
A. company CEO's time spent in bankruptcy court
B. maintaining cash reserves
C. maintaining a debt-equity ratio that is lower than the optimal ratio
D. losing a key company employee
E. paying an outside accountant fees to prepare bankruptcy reports

14. The static theory of capital structure advocates that the optimal capital structure for a firm:
A. is dependent on a constant debt-equity ratio over time.
B. remains fixed over time.
C. is independent of the firm's tax rate.
D. is independent of the firm's weighted average cost of capital.
E. equates the tax savings from an additional dollar of debt to the increased bankruptcy costs related to that additional dollar of debt.

15. Which form of financing do firms prefer to use first according to the pecking-order theory?
A. regular debt
B. convertible debt
C. common stock
D. preferred stock
E. internal funds

16. Which one of the following statements related to Chapter 7 bankruptcy is correct?
A. A firm in Chapter 7 bankruptcy is reorganizing its operations such that it can return to being a viable concern.
B. Under a Chapter 7 bankruptcy, a trustee will assume control of the firm's assets until those assets can be liquidated.
C. Chapter 7 bankruptcies are always involuntary on the part of the firm.
D. Under a Chapter 7 bankruptcy, the claims of creditors are paid prior to the administrative costs of the bankruptcy.

E. Chapter 7 bankruptcy allows a firm to restructure its equity such that new shares of stock are generally issued prior to the firm coming out of bankruptcy.

17. A firm may file for Chapter 11 bankruptcy:
I. in an attempt to gain a competitive advantage.
II. using a prepack.
III. while allowing the current management to continue running the firm.
IV. only after the firm becomes insolvent.
A. I and III only
B. I and II only
C. I, II, and IV only
D. I, II, and III only
E. I, II, III, and IV

18. Miller's Dry Goods is an all equity firm with 45,000 shares of stock outstanding at a market price of $50 a share. The company's earnings before interest and taxes are $128,000. Miller's has decided to add leverage to its financial operations by issuing $250,000 of debt at 8 percent interest. The debt will be used to repurchase shares of stock. You own 400 shares of Miller's stock. You also loan out funds at 8 percent interest. How many shares of Miller's stock must you sell to offset the leverage that Miller's is assuming? Assume you loan out all of the funds you receive from the sale of stock. Ignore taxes.
A. 35.6 shares
B. 40.0 shares
C. 44.4 shares
D. 47.5 shares
E. 50.1 shares

Miller's interest = $250,000 × 0.08 = $20,000
Miller's shares repurchased = $250,000/$50 = 5,000
Miller's shares outstanding with debt = 45,000 - 5,000 = 40,000
Miller's EPS, no debt = $128,000/45,000 = $2.844444
Miller's EPS, with debt = ($128,000 - $20,000)/40,000 = $2.70
Miller's value of stock = 40,000 × $50 = $2,000,000
Miller's value of debt = $250,000
Miller's total value = $2,000,000 + $250,000 = $2,250,000
Miller's weight stock = $2,000,000/$2,250,000 = 0.888889
Miller's weight debt = $250,000/$2,250,000 = 0.111111
Your initial investment = 400 × $50 = $20,000
Your new stock position = 0.888889 × $20,000 = $17,777.78
Your new number of shares = $17,777.78/$50 = 355.5556
Number of shares sold = 400 - 355.5556 = 44.4 shares
Check:
Your new loans = 0.111111 × $20,000 = $2,222.22

Your total unlevered income = 400 × $2.844444 = $1,137.78
Your total levered income = (355.5556 × $2.70) + ($2,222.22 × 0.08) = $1,137.78

19. The Jean Outlet is an all equity firm that has 146,000 shares of stock outstanding. The company has decided to borrow the $1.1 million to repurchase 7,500 shares of its stock from the estate of a deceased shareholder. What is the total value of the firm if you ignore taxes?
A. $18,387,702
B. $18,500,000
C. $19,666,667
D. $21,000,000
E. $21,413,333

Firm value = 146,000 × ($1.1m/7,500) = $21,413,333

20. The Corner Bakery has a debt-equity ratio of 0.54. The firm's required return on assets is 14.2 percent and its cost of equity is 16.1 percent. What is the pre-tax cost of debt based on M&M Proposition II with no taxes?
A. 7.10 percent
B. 8.79 percent
C. 10.68 percent
D. 17.56 percent
E. 18.40 percent

$R_E = 0.161 = 0.142 + (0.142 - R_d) \times 0.54$; $R_d = 10.68$ percent

21. Hanover Tech is currently an all equity firm that has 320,000 shares of stock outstanding with a market price of $19 a share. The current cost of equity is 15.4 percent and the tax rate is 36 percent. The firm is considering adding $1.2 million of debt with a coupon rate of 8 percent to its capital structure. The debt will be sold at par value. What is the levered value of the equity?
A. $5.209 million
B. $5.312 million
C. $5.436 million
D. $6.512 million
E. $6.708 million

$V_L = (320{,}000 \times \$19) + (0.36 \times \$1.2m) = \$6.512m$
$V_E = \$6.512m - \$1.2m = \$5.312m$

22. Down Bedding has an unlevered cost of capital of 13 percent, a cost of debt of 7.8 percent, and a tax rate of 32 percent. What is the target debt-equity ratio if the targeted cost of equity is 15.51 percent?
A. .63
B. .68
C. .71
D. .76
E. .84

$R_E = 0.1551 = 0.13 + (0.13 - 0.078) \times D/E \times (1 - 0.32)$; $D/E = 0.71$

23. Country Markets has an unlevered cost of capital of 12 percent, a tax rate of 38 percent, and expected earnings before interest and taxes of $15,700. The company has $11,000 in bonds outstanding that have a 6 percent coupon and pay interest annually. The bonds are selling at par value. What is the cost of equity?
A. 12.55 percent
B. 13.36 percent
C. 13.64 percent
D. 14.07 percent
E. 14.29 percent

$V_U = [\$15,700 \times (1- 0.38)]/0.12 = \$81,116.67$
$V_L = \$81,116.67 + (0.38 \times \$11,000) = \$85,296.67$
$V_E = \$85,296.67 - \$11,000 = \$74,296.67$
$R_E = 0.12 + [(0.12 - 0.06) \times (\$11,000/\$74,296.67) \times (1 - 0.38)] = 12.55$ percent

24. Douglass & Frank has a debt-equity ratio of 0.45. The pre-tax cost of debt is 7.6 percent while the unlevered cost of capital is 13.3 percent. What is the cost of equity if the tax rate is 39 percent?
A. 13.79 percent
B. 14.86 percent
C. 15.92 percent
D. 18.40 percent
E. 18.87 percent

$R_E = 0.133 + (0.133 - 0.076) \times 0.45 \times (1 - 0.39) = 14.86$ percent

25. D. L. Tuckers has $21,000 of debt outstanding that is selling at par and has a coupon rate of 7.5 percent. The tax rate is 32 percent. What is the present value of the tax shield?
A. $504
B. $615
C. $644
D. $6,200
E. $6,720

Present value of the tax shield = 0.32 × $21,000 = $6,720

26. Percy's Wholesale Supply has earnings before interest and taxes of $106,000. Both the book and the market value of debt is $170,000. The unlevered cost of equity is 15.5 percent while the pre-tax cost of debt is 8.6 percent. The tax rate is 38 percent. What is the firm's weighted average cost of capital?
A. 11.94 percent
B. 12.65 percent
C. 13.45 percent
D. 14.01 percent
E. 14.37 percent

V_U = [$106,000 × (1 - 0.38)]/0.155 = $424,000
V_L = $424,000 + (0.38 × $170,000) = $488,600
V_E = $488,600 - $170,000 = $318,600
R_E = 0.155 + (0.155 - 0.086) × ($170,000/$318,600) × (1 - 0.38) = 0.177827
WACC = [($318,600/$488,600) × 0.177827] + [($170,000/$488,600) × 0.086 × (1 - 0.38)] = 13.45 percent