

CHAPTER 15
Capital Structure: Basic Concepts

Multiple Choice Questions:

I. DEFINITIONS

HOMEMADE LEVERAGE

- a 1. The use of personal borrowing to change the overall amount of financial leverage to which an individual is exposed is called:
- a. homemade leverage.
 - b. dividend recapture.
 - c. the weighted average cost of capital.
 - d. private debt placement.
 - e. personal offset.

Difficulty level: Easy

MM PROPOSITION I

- b 2. The proposition that the value of the firm is independent of its capital structure is called:
- a. the capital asset pricing model.
 - b. MM Proposition I.
 - c. MM Proposition II.
 - d. the law of one price.
 - e. the efficient markets hypothesis.

Difficulty level: Easy

MM PROPOSITION II

- c 3. The proposition that the cost of equity is a positive linear function of capital structure is called:
- a. the capital asset pricing model.
 - b. MM Proposition I.
 - c. MM Proposition II.
 - d. the law of one price.
 - e. the efficient markets hypothesis.

Difficulty level: Medium

INTEREST TAX SHIELD

- a 4. The tax savings of the firm derived from the deductibility of interest expense is called the:
- a. interest tax shield.
 - b. depreciable basis.
 - c. financing umbrella.
 - d. current yield.
 - e. tax-loss carryforward savings.

Difficulty level: Easy

UNLEVERED COST OF CAPITAL

- b 5. The unlevered cost of capital is:
- the cost of capital for a firm with no equity in its capital structure.
 - the cost of capital for a firm with no debt in its capital structure.
 - the interest tax shield times pretax net income.
 - the cost of preferred stock for a firm with equal parts debt and common stock in its capital structure.
 - equal to the profit margin for a firm with some debt in its capital structure.

Difficulty level: Easy

WEIGHTED AVERAGE COST OF CAPITAL

- e 6. The cost of capital for a firm, rWACC, in a zero tax environment is:
- equal to the expected earnings divided by market value of the unlevered firm.
 - equal to the rate of return for that business risk class.
 - equal to the overall rate of return required on the levered firm.
 - is constant regardless of the amount of leverage.
 - All of the above.

Difficulty level: Medium

BALANCE SHEET

- d 7. The difference between a market value balance sheet and a book value balance sheet is that a market value balance sheet:
- places assets on the right hand side.
 - places liabilities on the left hand side.
 - does not equate the right hand with the left hand side.
 - lists items in terms of market values, not historical costs.
 - uses the market rate of return.

Difficulty level: Easy

CAPITAL STRUCTURE DEFINITION

- d 8. The firm's capital structure refers to:
- the way a firm invests its assets.
 - the amount of capital in the firm.
 - the amount of dividends a firm pays.
 - the mix of debt and equity used to finance the firm's assets.
 - how much cash the firm holds.

Difficulty level: Easy

II. CONCEPTS

MAXIMIZATION OF FIRM VALUE

- b 9. A general rule for managers to follow is to set the firm's capital structure such that:
- the firm's value is minimized.
 - the firm's value is maximized.
 - the firm's bondholders are made well off.
 - the firm's suppliers of raw materials are satisfied.
 - the firm's dividend payout is maximized.

Difficulty level: Easy

THE LEVERED FIRM

- b 10. A levered firm is a company that has:
- Accounts Payable as the only liability on the balance sheet.
 - has some debt in the capital structure.
 - has all equity in the capital structure.
 - All of the above.
 - None of the above.

Difficulty level: Easy

CAPITAL STRUCTURE AND THE MANAGER

- a 11. A manager should attempt to maximize the value of the firm by:
- changing the capital structure if and only if the value of the firm increases.
 - changing the capital structure if and only if the value of the firm increases to the benefits to inside management.
 - changing the capital structure if and only if the value of the firm increases only to the benefits the debtholders.
 - changing the capital structure if and only if the value of the firm increases although it decreases the stockholders' value.
 - changing the capital structure if and only if the value of the firm increases and stockholder wealth is constant.

Difficulty level: Easy

EPS-EBI ANALYSIS

- d 12. The effect of financial leverage depends on the operating earnings of the company. Which of the following is not true?
- Below the indifference or break-even point in EBIT the non-levered structure is superior.
 - Financial leverage increases the slope of the EPS line.
 - Above the indifference or break-even point the increase in EPS for all equity plans is less than debt-equity plans.
 - Above the indifference or break-even point the increase in EPS for all equity plans is greater than debt-equity plans.
 - The rate of return on operating assets is unaffected by leverage.

Difficulty level: Medium

MM PROPOSITION I

- a 13. The Modigliani-Miller Proposition I without taxes states:
- a firm cannot change the total value of its outstanding securities by changing its capital structure proportions.
 - when new projects are added to the firm the firm value is the sum of the old value plus the new.
 - managers can make correct corporate decisions that will satisfy all shareholders if they select projects that maximize value.
 - the determination of value must consider the timing and risk of the cash flows.
 - None of the above.

Difficulty level: Medium

MM PROPOSITION I

- e 14. MM Proposition I without taxes is used to illustrate:
- the value of an unlevered firm equals that of a levered firm.
 - that one capital structure is as good as another.
 - leverage does not affect the value of the firm.
 - capital structure changes have no effect stockholder's welfare.
 - All of the above.

Difficulty level: Medium

MM PROPOSITION I

- c 15. A key assumption of MM's Proposition I without taxes is:
- that financial leverage increases risk.
 - that individuals can borrow on their own account at rates less than the firm.
 - that individuals must be able to borrow on their own account at rates equal to the firm.
 - managers are acting to maximize the value of the firm.
 - All of the above.

Difficulty level: Medium

EPS-EBI ANALYSIS

- c 16. In an EPS-EBI graphical relationship, the slope of the debt ray is steeper than the equity ray. The debt ray has a lower intercept because:
- more shares are outstanding for the same level of EBI.
 - the break-even point is higher with debt.
 - a fixed interest charge must be paid even at low earnings.
 - the amount of interest per share has only a positive effect on the intercept.
 - the higher the interest rate the greater the slope.

Difficulty level: Medium

EPS-EBI ANALYSIS

- b 17. In an EPS-EBI graphical relationship, the debt ray and equity ray cross. At this point the equity and debt are:
- equivalent with respect to EPS but above and below this point equity is always superior.
 - at breakeven in EPS but above this point debt increases EPS via leverage and decreases EPS below this point.
 - equal but away from breakeven equity is better as fewer shares are outstanding.
 - at breakeven and MM Proposition II states that debt is the better choice.
 - at breakeven and debt is the better choice below breakeven because small payments can be made.

Difficulty level: Medium

EPS-EBI ANALYSIS

- c 18. When comparing levered vs. unlevered capital structures, leverage works to increase EPS for high levels of EBIT because:
- interest payments on the debt vary with EBIT levels.
 - interest payments on the debt stay fixed, leaving less income to be distributed over less shares.
 - interest payments on the debt stay fixed, leaving more income to be distributed over less shares.
 - interest payments on the debt stay fixed, leaving less income to be distributed over more shares.
 - interest payments on the debt stay fixed, leaving more income to be distributed over more shares.

Difficulty level: Medium

FINANCIAL LEVERAGE

- d 19. Financial leverage impacts the performance of the firm by:
- increasing the volatility of the firm's EBIT.
 - decreasing the volatility of the firm's EBIT.
 - decreasing the volatility of the firm's net income.
 - increasing the volatility of the firm's net income
 - None of the above.

Difficulty level: Medium

EPS AND RISK TO EQUITYHOLDERS

- b 20. The increase in risk to equityholders when financial leverage is introduced is evidenced by:
- higher EPS as EBIT increases.
 - a higher variability of EPS with debt than all equity.
 - increased use of homemade leverage.
 - equivalence value between levered and unlevered firms in the presence of taxes.
 - None of the above.

Difficulty level: Medium

MM PROPOSITION I

- a 21. The reason that MM Proposition I does not hold in the presence of corporate taxation is because:
- a. levered firms pay less taxes compared with identical unlevered firms.
 - b. bondholders require higher rates of return compared with stockholders.
 - c. earnings per share are no longer relevant with taxes.
 - d. dividends are no longer relevant with taxes.
 - e. All of the above.

Difficulty level: Medium

MM PROPOSITION I

- d 22. MM Proposition I with corporate taxes states that:
- a. capital structure can affect firm value.
 - b. by raising the debt-to-equity ratio, the firm can lower its taxes and thereby increase its total value.
 - c. firm value is maximized at an all debt capital structure.
 - d. All of the above.
 - e. None of the above.

Difficulty level: Medium

FIRM VARIATION WITH CORPORATE TAXES

- b 23. The change in firm value in the presence of corporate taxes only is:
- a. positive as equityholders face a lower effective tax rate.
 - b. positive as equityholders gain the tax shield on the debt interest.
 - c. negative because of the increased risk of default and fewer shares outstanding.
 - d. negative because of a reduction of equity outstanding.
 - e. None of the above.

Difficulty level: Medium

CAPITAL STRUCTURE

- b 24. A firm should select the capital structure which:
- a. produces the highest cost of capital.
 - b. maximizes the value of the firm.
 - c. minimizes taxes.
 - d. is fully unlevered.
 - e. has no debt.

Difficulty level: Medium

MM WITHOUT TAXES

- d 25. In a world of no corporate taxes if the use of leverage does not change the value of the levered firm relative to the unlevered firm this is known as:
- MM Proposition III that the cost of stock is less than the cost of debt.
 - MM Proposition I that leverage is invariant to market value.
 - MM Proposition II that the cost of equity is always constant.
 - MM Proposition I that the market value of the firm is invariant to the capital structure.
 - MM Proposition III that there is no risk associated with leverage in a no tax world.

Difficulty level: Medium

HOMEMADE LEVERAGE

- d 26. Bryan invested in Bryco, Inc. stock when the firm was financed solely with equity. The firm is now utilizing debt in its capital structure. To unlever his position, Bryan needs to:
- borrow some money and purchase additional shares of Bryco stock.
 - maintain his current position as the debt of the firm did not affect his personal leverage position.
 - sell some shares of Bryco stock and hold the proceeds in cash.
 - sell some shares of Bryco stock and loan it out such that he creates a personal debt-equity ratio equal to that of the firm.
 - create a personal debt-equity ratio that is equal to exactly 50% of the debt-equity ratio of the firm.

Difficulty level: Medium

HOMEMADE LEVERAGE

- e 27. The capital structure chosen by a firm doesn't really matter because of:
- taxes.
 - the interest tax shield.
 - the relationship between dividends and earnings per share.
 - the effects of leverage on the cost of equity.
 - homemade leverage.

Difficulty level: Medium

MM PROPOSITION I, NO TAX

- c 28. MM Proposition I with no tax supports the argument that:
- business risk determines the return on assets.
 - the cost of equity rises as leverage rises.
 - it is completely irrelevant how a firm arranges its finances.
 - a firm should borrow money to the point where the tax benefit from debt is equal to the cost of the increased probability of financial distress.
 - financial risk is determined by the debt-equity ratio.

Difficulty level: Medium

MM PROPOSITION I, NO TAX

- a 29. The proposition that the value of a levered firm is equal to the value of an unlevered firm is known as:
- MM Proposition I with no tax.
 - MM Proposition II with no tax.
 - MM Proposition I with tax.
 - MM Proposition II with tax.
 - static theory proposition.

Difficulty level: Medium

MM PROPOSITION I, NO TAX

- a 30. The concept of homemade leverage is most associated with:
- MM Proposition I with no tax.
 - MM Proposition II with no tax.
 - MM Proposition I with tax.
 - MM Proposition II with tax.
 - static theory proposition.

Difficulty level: Medium

MM PROPOSITION II, NO TAX

- c 31. Which of the following statements are correct in relation to MM Proposition II with no taxes?
- The return on assets is equal to the weighted average cost of capital.
 - Financial risk is determined by the debt-equity ratio.
 - Financial risk determines the return on assets.
 - The cost of equity declines when the amount of leverage used by a firm rises.
- I and III only
 - II and IV only
 - I and II only
 - III and IV only
 - I and IV only

Difficulty level: Medium

MM PROPOSITION I, WITH TAX

- a 32. MM Proposition I with taxes supports the theory that:
- there is a positive linear relationship between the amount of debt in a levered firm and its value.
 - the value of a firm is inversely related to the amount of leverage used by the firm.
 - the value of an unlevered firm is equal to the value of a levered firm plus the value of the interest tax shield.
 - a firm's cost of capital is the same regardless of the mix of debt and equity used by the firm.
 - a firm's weighted average cost of capital increases as the debt-equity ratio of the firm rises.

Difficulty level: Medium

MM PROPOSITION I, WITH TAX

- d 33. MM Proposition I with taxes is based on the concept that:
- the optimal capital structure is the one that is totally financed with equity.
 - the capital structure of the firm does not matter because investors can use homemade leverage.
 - the firm is better off with debt based on the weighted average cost of capital.
 - the value of the firm increases as total debt increases because of the interest tax shield.
 - the cost of equity increases as the debt-equity ratio of a firm increases.

Difficulty level: Medium

MM PROPOSITION II, WITH TAX

- a 34. MM Proposition II with taxes:
- has the same general implications as MM Proposition II without taxes.
 - reveals how the interest tax shield relates to the value of a firm.
 - supports the argument that business risk is determined by the capital structure employed by a firm.
 - supports the argument that the cost of equity decreases as the debt-equity ratio increases.
 - reaches the final conclusion that the capital structure decision is irrelevant to the value of a firm.

Difficulty level: Medium

MM PROPOSITION II

- c 35. MM Proposition II is the proposition that:
- supports the argument that the capital structure of a firm is irrelevant to the value of the firm.
 - the cost of equity depends on the return on debt, the debt-equity ratio and the tax rate.
 - a firm's cost of equity capital is a positive linear function of the firm's capital structure.
 - the cost of equity is equivalent to the required return on the total assets of a firm.
 - supports the argument that the size of the pie does not depend on how the pie is sliced.

Difficulty level: Medium

INTEREST TAX SHIELD

- c 36. The interest tax shield has no value for a firm when:
- the tax rate is equal to zero.
 - the debt-equity ratio is exactly equal to 1.
 - the firm is unlevered.
 - a firm elects 100% equity as its capital structure.
- I and III only
 - II and IV only
 - I, III, and IV only
 - II, III, and IV only
 - I, II, and IV only

Difficulty level: Medium

INTEREST TAX SHIELD

- c 37. The interest tax shield is a key reason why:
- the required rate of return on assets rises when debt is added to the capital structure.
 - the value of an unlevered firm is equal to the value of a levered firm.
 - the net cost of debt to a firm is generally less than the cost of equity.
 - the cost of debt is equal to the cost of equity for a levered firm.
 - firms prefer equity financing over debt financing.

Difficulty level: Medium

INTEREST TAX SHIELD

- d 38. Which of the following will tend to diminish the benefit of the interest tax shield given a progressive tax rate structure?
- a reduction in tax rates
 - a large tax loss carryforward
 - a large depreciation tax deduction
 - a sizeable increase in taxable income
- I and II only
 - I and III only
 - II and III only
 - I, II, and III only
 - I, II, III, and IV

Difficulty level: Medium

III. PROBLEMS

MM PROPOSITION I, NO TAX

- a 39. Thompson & Thomson is an all equity firm that has 500,000 shares of stock outstanding. The company is in the process of borrowing \$8 million at 9% interest to repurchase 200,000 shares of the outstanding stock. What is the value of this firm if you ignore taxes?
- \$20.0 million
 - \$20.8 million
 - \$21.0 million
 - \$21.2 million
 - \$21.3 million

Difficulty level: Medium

MM PROPOSITION I, NO TAX

- c 40. Uptown Interior Designs is an all equity firm that has 40,000 shares of stock outstanding. The company has decided to borrow \$1 million to buy out the shares of a deceased stockholder who holds 2,500 shares. What is the total value of this firm if you ignore taxes?
- \$15.5 million
 - \$15.6 million
 - \$16.0 million
 - \$16.8 million
 - \$17.2 million

Difficulty level: Medium

MM PROPOSITION I, NO TAX

- e 41. You own 25% of Unique Vacations, Inc. You have decided to retire and want to sell your shares in this closely held, all equity firm. The other shareholders have agreed to have the firm borrow \$1.5 million to purchase your 1,000 shares of stock. What is the total value of this firm today if you ignore taxes?
- a. \$4.8 million
 - b. \$5.1 million
 - c. \$5.4 million
 - d. \$5.7 million
 - e. \$6.0 million

Difficulty level: Medium

MM PROPOSITION II, NO TAX

- d 42. Your firm has a debt-equity ratio of .75. Your pre-tax cost of debt is 8.5% and your required return on assets is 15%. What is your cost of equity if you ignore taxes?
- a. 11.25%
 - b. 12.21%
 - c. 16.67%
 - d. 19.88%
 - e. 21.38%

Difficulty level: Medium

MM PROPOSITION II, NO TAX

- b 43. Bigelow, Inc. has a cost of equity of 13.56% and a pre-tax cost of debt of 7%. The required return on the assets is 11%. What is the firm's debt-equity ratio based on MM Proposition II with no taxes?
- a. .60
 - b. .64
 - c. .72
 - d. .75
 - e. .80

Difficulty level: Medium

MM PROPOSITION II, NO TAX

- d 44. The Backwoods Lumber Co. has a debt-equity ratio of .80. The firm's required return on assets is 12% and its cost of equity is 15.68%. What is the pre-tax cost of debt based on MM Proposition II with no taxes?
- a. 6.76%
 - b. 7.00%
 - c. 7.25%
 - d. 7.40%
 - e. 7.50%

Difficulty level: Medium

MM PROPOSITION I, WITH TAX

- b 45. The Winter Wear Company has expected earnings before interest and taxes of \$2,100, an unlevered cost of capital of 14% and a tax rate of 34%. The company also has \$2,800 of debt that carries a 7% coupon. The debt is selling at par value. What is the value of this firm?
- a. \$9,900
 - b. \$10,852
 - c. \$11,748
 - d. \$12,054
 - e. \$12,700

Difficulty level: Medium

MM PROPOSITION I, WITH TAX

- b 46. Gail's Dance Studio is currently an all equity firm that has 80,000 shares of stock outstanding with a market price of \$42 a share. The current cost of equity is 12% and the tax rate is 34%. Gail is considering adding \$1 million of debt with a coupon rate of 8% to her capital structure. The debt will be sold at par value. What is the levered value of the equity?
- a. \$2.4 million
 - b. \$2.7 million
 - c. \$3.3 million
 - d. \$3.7 million
 - e. \$3.9 million

Difficulty level: Medium

MM PROPOSITION I, WITH TAX

- c 47. The Montana Hills Co. has expected earnings before interest and taxes of \$8,100, an unlevered cost of capital of 11%, and debt with both a book and face value of \$12,000. The debt has an annual 8% coupon. The tax rate is 34%. What is the value of the firm?
- a. \$48,600
 - b. \$50,000
 - c. \$52,680
 - d. \$56,667
 - e. \$60,600

Difficulty level: Medium

MM PROPOSITION I, WITH TAX

- c 48. Scott's Leisure Time Sports is an unlevered firm with an after-tax net income of \$86,000. The unlevered cost of capital is 10% and the tax rate is 34%. What is the value of this firm?
- a. \$567,600
 - b. \$781,818
 - c. \$860,000
 - d. \$946,000
 - e. \$1,152,400

Difficulty level: Easy

MM PROPOSITION I, WITH TAX

- c 49. An unlevered firm has a cost of capital of 14% and earnings before interest and taxes of \$150,000. A levered firm with the same operations and assets has both a book value and a face value of debt of \$700,000 with a 7% annual coupon. The applicable tax rate is 35%. What is the value of the levered firm?
- a. \$696,429
 - b. \$907,679
 - c. \$941,429
 - d. \$1,184,929
 - e. \$1,396,429

Difficulty level: Medium

MM PROPOSITION II, WITH TAX

- c 50. The Spartan Co. has an unlevered cost of capital of 11%, a cost of debt of 8%, and a tax rate of 35%. What is the target debt-equity ratio if the targeted cost of equity is 12%?
- a. .44
 - b. .49
 - c. .51
 - d. .56
 - e. .62

Difficulty level: Medium

MM PROPOSITION II, WITH TAX

- d 51. Hey Guys!, Inc. has debt with both a face and a market value of \$3,000. This debt has a coupon rate of 7% and pays interest annually. The expected earnings before interest and taxes is \$1,200, the tax rate is 34%, and the unlevered cost of capital is 12%. What is the firm's cost of equity?
- a. 13.25%
 - b. 13.89%
 - c. 13.92%
 - d. 14.14%
 - e. 14.25%

Difficulty level: Challenge

MM PROPOSITION II, WITH TAX

- e 52. Anderson's Furniture Outlet has an unlevered cost of capital of 10%, a tax rate of 34%, and expected earnings before interest and taxes of \$1,600. The company has \$3,000 in bonds outstanding that have an 8% coupon and pay interest annually. The bonds are selling at par value. What is the cost of equity?
- a. 8.67%
 - b. 9.34%
 - c. 9.72%
 - d. 9.99%
 - e. 10.46%

Difficulty level: Challenge

MM PROPOSITION II, WITH TAX

- b 53. Walter's Distributors have a cost of equity of 13.84% and an unlevered cost of capital of 12%. The company has \$5,000 in debt that is selling at par value. The levered value of the firm is \$12,000 and the tax rate is 34%. What is the pre-tax cost of debt?
- 7.92%
 - 8.10%
 - 8.16%
 - 8.84%
 - 9.00%

Difficulty level: Medium

MM PROPOSITION II, WITH TAX

- b 54. Rosita's has a cost of equity of 13.8% and a pre-tax cost of debt of 8.5%. The debt-equity ratio is .60 and the tax rate is .34. What is Rosita's unlevered cost of capital?
- 8.83%
 - 12.30%
 - 13.97%
 - 14.08%
 - 14.60%

Difficulty level: Medium

MM PROPOSITION II, WITH TAX

- e 55. Your firm has a pre-tax cost of debt of 7% and an unlevered cost of capital of 13%. Your tax rate is 35% and your cost of equity is 15.26%. What is your debt-equity ratio?
- .43
 - .49
 - .51
 - .54
 - .58

Difficulty level: Medium

MM PROPOSITION II, WITH TAX

- c 56. Wild Flowers Express has a debt-equity ratio of .60. The pre-tax cost of debt is 9% while the unlevered cost of capital is 14%. What is the cost of equity if the tax rate is 34%?
- 7.52%
 - 8.78%
 - 15.98%
 - 16.83%
 - 17.30%

Difficulty level: Medium

INTEREST TAX SHIELD

- a 57. Your firm has a \$250,000 bond issue outstanding. These bonds have a 7% coupon, pay interest semiannually, and have a current market price equal to 103% of face value. What is the amount of the annual interest tax shield given a tax rate of 35%?
- a. \$6,125
 - b. \$6,309
 - c. \$9,500
 - d. \$17,500
 - e. \$18,025

Difficulty level: Easy

INTEREST TAX SHIELD

- d 58. Bertha's Boutique has 2,000 bonds outstanding with a face value of \$1,000 each and a coupon rate of 9%. The interest is paid semi-annually. What is the amount of the annual interest tax shield if the tax rate is 34%?
- a. \$58,500
 - b. \$60,100
 - c. \$60,750
 - d. \$61,200
 - e. \$62,250

Difficulty level: Easy

INTEREST TAX SHIELD

- c 59. Juanita's Steak House has \$12,000 of debt outstanding that is selling at par and has a coupon rate of 8%. The tax rate is 34%. What is the present value of the tax shield?
- a. \$2,823
 - b. \$2,887
 - c. \$4,080
 - d. \$4,500
 - e. \$4,633

Difficulty level: Medium

WEIGHTED AVERAGE COST OF CAPITAL

- d 60. A firm has debt of \$5,000, equity of \$16,000, a leveraged value of \$8,900, a cost of debt of 8%, a cost of equity of 12%, and a tax rate of 34%. What is the firm's weighted average cost of capital?
- a. 7.29%
 - b. 7.94%
 - c. 8.87%
 - d. 10.40%
 - e. 11.05%

Difficulty level: Medium

COST OF EQUITY

- c 61. A firm has zero debt in its capital structure. Its overall cost of capital is 10%. The firm is considering a new capital structure with 60% debt. The interest rate on the debt would be 8%. Assuming there are no taxes or other imperfections, its cost of equity capital with the new capital structure would be _____ .
- a. 9%
 - b. 10%
 - c. 13%
 - d. 14%
 - e. None of the above.

Difficulty level: Medium

COST OF EQUITY

- c 62. A firm has a debt-to-equity ratio of .60. Its cost of debt is 8%. Its overall cost of capital is 12%. What is its cost of equity if there are no taxes or other imperfections?
- a. 10.0%
 - b. 13.5%
 - c. 14.4%
 - d. 18.0%
 - e. None of the above.

Difficulty level: Medium

COST OF EQUITY

- c 63. A firm has a debt-to-equity ratio of 1. Its cost of equity is 16%, and its cost of debt is 8%. If there are no taxes or other imperfections, what would be its cost of equity if the debt-to-equity ratio were 0?
- a. 8%
 - b. 10%
 - c. 12%
 - d. 14%
 - e. 16%

Difficulty level: Challenge

COST OF EQUITY

- d 64. A firm has a debt-to-equity ratio of 1.20. If it had no debt, its cost of equity would be 15%. Its cost of debt is 10%. What is its cost of equity if there are no taxes or other imperfections?
- a. 10%
 - b. 15%
 - c. 18%
 - d. 21%
 - e. None of the above.

Difficulty level: Easy

COST OF EQUITY

- d 65. If a firm is unlevered and has a cost of equity capital 12%, what would its cost of equity be if its debt-equity ratio became 2? The expected cost of debt is 8%.
- a. 14.0%
 - b. 14.67%
 - c. 16.0%
 - d. 20.0%
 - e. None of the above.

Difficulty level: Medium

COST OF EQUITY WITH DEBT

- c 66. A firm has zero debt in its capital structure. Its overall cost of capital is 9%. The firm is considering a new capital structure with 40% debt. The interest rate on the debt would be 4%. Assuming that the corporate tax rate is 34%, what would its cost of equity capital with the new capital structure be?
- a. 10.3%
 - b. 11.0%
 - c. 11.2%
 - d. 13.9%
 - e. None of the above.

Difficulty level: Challenge

COST OF EQUITY WITH DEBT

- b 67. A firm has a debt-to-equity ratio of 1. Its cost of equity is 16%, and its cost of debt is 8%. If the corporate tax rate is 25%, what would its cost of equity be if the debt-to-equity ratio were 0?
- a. 11.11%
 - b. 12.57%
 - c. 13.33%
 - d. 16.00%
 - e. None of the above.

Difficulty level: Challenge

COST OF EQUITY

- b 68. A firm has a debt-to-equity ratio of .5. Its cost of equity is 22%, and its cost of debt is 16%. If the corporate tax rate is .40, what would its cost of equity be if the debt-to-equity ratio were 0?
- a. 14.00%
 - b. 20.61%
 - c. 21.07%
 - d. 22.00%
 - e. None of the above.

Difficulty level: Challenge

COST OF EQUITY WITH TAXES

- c 69. A firm has a debt-to-equity ratio of 1.75. If it had no debt, its cost of equity would be 14%. Its cost of debt is 10%. What is its cost of equity if the corporate tax rate is 50%?
- 14.0%
 - 16.0%
 - 17.5%
 - 21.0%
 - None of the above.

Difficulty level: Medium

COST OF EQUITY WITH TAXES

- d 70. What is its cost of equity for a firm if the corporate tax rate is 40%? The firm has a debt-to-equity ratio of 1.5. If it had no debt, its cost of equity would be 16%. Its current cost of debt is 12%.
- 17.4%
 - 18.4%
 - 19.6%
 - 21.4%
 - None of the above.

Difficulty level: Medium

COST OF EQUITY WITH TAXES

- c 71. A firm has a debt-to-equity ratio of 1.75. If it had no debt, its cost of equity would be 9%. Its cost of debt is 7%. What is its cost of equity if the corporate tax rate is 50%?
- 7.73%
 - 10.00%
 - 10.75%
 - 12.50%
 - None of the above.

Difficulty level: Medium

IV. ESSAYS

CAPITAL STRUCTURE THEORIES

72. Based on MM with taxes and without taxes, how much time should a financial manager spend analyzing the capital structure of his firm? What if the analysis is based on the static theory?

Under either MM scenario, the financial manager should invest no time in analyzing the firm's capital structure. With no taxes, capital structure is irrelevant. With taxes, MM says a firm will maximize its value by using 100% debt. In both cases, the manager has nothing to decide. With the static theory, however, the manager must determine the optimal amount of debt and equity by analyzing the tradeoff between the benefits of the interest tax shield versus the financial distress costs. Ultimately, finding the optimal capital structure is challenging in this case.

HOMEMADE LEVERAGE

73. Explain homemade leverage and why it matters.

Homemade leverage is the ability of investors to alter their own financial leverage to achieve a desired capital structure no matter what a firm's capital structure might be. If investors can use homemade leverage to create additional leverage or to undo existing leverage of the firm at their discretion then the actual capital structure decision of the firm itself becomes irrelevant.

COST OF EQUITY

74. In each of the theories of capital structure the cost of equity rises as the amount of debt increases. So why don't financial managers use as little debt as possible to keep the cost of equity down? After all, isn't the goal of the firm to maximize share value and minimize shareholder costs?

This question requires students to differentiate between the cost of equity and the weighted average cost of capital. In fact, it gets to the essence of capital structure theory: the firm trades off higher equity costs for lower debt costs. The shareholders benefit (to a point, according to the static theory) because their investment in the firm is leveraged, enhancing the return on their investment. Thus, even though the cost of equity rises, the overall cost of capital declines (again, up to a point according to the static theory) and firm value rises.

The following information should be used for problems #74 - 76:

Consider two firms, U and L, both with \$50,000 in assets. Firm U is unlevered, and firm L has \$20,000 of debt that pays 8% interest. Firm U has 1,000 shares outstanding, while firm L has 600 shares outstanding. Mike owns 20% of firm L and believes that leverage works in his favor. Steve tells Mike that this is an illusion, and that with the possibility of borrowing on his own account at 8% interest, he can replicate Mike's payout from firm L.

LEVERED AND UNLEVERED FIRMS

75. Given a level of operating income of \$2,500, show the specific strategy that Mike has in mind.

*Mike is entitled to $.2(\$2,500 - \$1,600) = \$180$
Steve borrows \$4,000 at 8% interest (20% of Firm L's Debt) and pays \$320 in interest.
Steve purchases 20% of firm U's equity and gets $.2(\$2,500) = \500
Steve's total payout is $\$500 - \$320 = \$180$, or Mike's payout.*

LEVERED AND UNLEVERED FIRMS

76. After seeing Steve's analysis, Mike tells Steve that while his analysis looks good on paper, Steve will never be able to borrow at 8%, but would have to pay a more realistic rate of 12%. If Mike is right, what will Steve's payout be?

*Steve borrows \$4,000 at 12% interest = \$480
Steve purchases 20% of Firm U's equity and gets $.2(\$2,500) = \500
Steve's total payout is $\$500 - \$480 = \$20$*

VALUE OF A LEVERED FIRM

77. Suppose the tax authorities allow firms to deduct their interest expense from operating income. Both firm U and firm L are in the 34% tax bracket. Show what happens to the market value of both firms if the debt held by firm L is permanent. Assume MM with taxes.

Firm U: No Change – Still Worth \$50,000
Firm L: New Value – \$50,000 + (.34) (\$20,000) = \$56,800

WACC

78. The Nantucket Nugget is unlevered and is valued at \$640,000. Nantucket is currently deciding whether including debt in its capital structure would increase its value. The current cost of equity is 12%. Under consideration is issuing \$300,000 in new debt with an 8% interest rate. Nantucket would repurchase \$300,000 of stock with the proceeds of the debt issue. There are currently 32,000 shares outstanding and effective marginal tax bracket is zero. What will Nantucket's new WACC be?

New Firm Value: $\$640,000 + (.0) (\$300,000) = \$640,000$
Capital Structure = D + E = 300,000 + 340,000
 $rs = .12 + (300/340) * (.12 - .08) = .12 + .0353 = .1553 = 15.53\%$
 $WACC = (300/640) * (.08) + (340/640) * (.1553) = .0375 + .0825 = .12 = 12\%$
The value of the firm stays at \$640,000 (MM I), the cost of levered equity rises to 15.53% and the WACC remains at 12%.

WACC

79. The Nantucket Nugget is unlevered and is valued at \$640,000. Nantucket is currently deciding whether including debt in its capital structure would increase its value. The current cost of equity is 12%. Under consideration is issuing \$300,000 in new debt with an 8% interest rate. Nantucket would repurchase \$300,000 of stock with the proceeds of the debt issue. There are currently 32,000 shares outstanding and its effective marginal tax bracket is 34%. What will Nantucket's new WACC be?

New Firm Value: $\$640,000 + (.34) (\$300,000) = \$742,000$
Capital Structure = D + E = \$300,000 + \$442,000
 $rs = .12 + (300/442) * (.12 - .08) * (1 - .34) = .12 + .0179 = .1379 = 13.79\%$
 $WACC = (300/742) * (.08) * (1 - .34) + (442/742) * (.1379) = .0213 + .0821 = .1034 = 10.34\%$
The value of the firm increases to \$742,000 (From Value of the Tax Shield), increasing the relative weight of equity and the cost of levered equity rises to 13.79% and the WACC falls to at 10.34% consistent with the increase in firm value.

WACC AND LEVERAGE

80. The weighted average cost of capital is invariant to the use of leverage under MM conditions of no taxes. Graph the relationship of the weighted average cost of capital and leverage; be sure to include the cost of equity and debt. Explain why this relationship holds.

See graph page 433.

In a world without taxes or financial distress, as one adds more debt to the capital structure, the cost of residual equity increases by just enough to offset the increase risk. Thus, WACC remains constant and capital structure is irrelevant (MM Propositions I and II without taxes).

MM WITH TAXES

81. The value of the firm is maximized by taking on as much debt as possible. Show graphically how adding debt can increase value through the overall cost of capital. Explain under what conditions how this impacts the cost of capital and translates into firm value.

See graphs pages 443 and 445.

This is MM Proposition I and II with corporate taxes. The tax shield on leverage reduces slope of r_s to $(1 - T_c)$ which does not fully offset gain from leverage.

EPS-EBI

82. The financial manager for a new startup company is faced with a problem of how to finance this new firm. She has estimated EBIT of \$200,000; \$500,000; \$900,000; and \$1,500,000 for each of the four equally likely states of the economy. The firm needs \$5,000,000 in funds to become operational. The question is whether \$5,000,000 of new equity at \$20 a share should be sold or a 50/50 debt/equity capital structure with 10% coupon rate debt is better. Calculate the EPS for each plan and economic state. What is the expected EPS for each plan? What should the firm do?

See graphs pages 430.

This is MM Proposition I and II with corporate taxes. The tax shield on leverage reduces slope of r_s to $(1 - T_c)$ which does not fully offset gain from leverage.

SOLUTIONS TO TEST BANK PROBLEMS

Chapter 15

38. Price per share = $\$8\text{m} \div 200\text{k} = \40 ; $[(500,000 - 200,000) \times \$40] + \$8\text{m} = 500,000 \times \$40 = \$20\text{m}$; Value of the firm is $\$20\text{m}$
39. Price per share = $\$1\text{m} \div 2,500 = \400 ; $[(40,000 - 2,500) \times \$400] + \$1\text{m} = 40,000 \times \$400 = \$16\text{m}$
40. Price per share = $\$1.5\text{m} \div 1,000 = \$1,500$; Current number of shares = $1,000 \div .25 = 4,000$; $[(4,000 - 1,000) \times \$1,500] + \$1.5\text{m} = 4,000 \times \$1,500 = \$6\text{m}$
41. $R_e = .15 + (.15 - .085) \times .75 = .19875 = 19.88\%$
42. $.1356 = .11 + (.11 - .07) \times D/E$; $D/E = .64$
43. $.1568 = .12 + (.12 - R_d) \times .80$; $R_d = .074 = 7.40\%$
44. $V_U = [\$2,100 \times (1 - .34)] \div .14 = \$9,900$; $V_L = \$9,900 + (.34 \times \$2,800) = \$10,852$
45. $V_L = (80,000 \times \$42) + (.34 \times \$1\text{m}) = \$3.36\text{m} + .34\text{m} = \3.7m ; $V_E = \$3.7\text{m} - \$1\text{m} = \$2.7\text{m}$
46. $V_U = [\$8,100 \times (1 - .34)] \div .11 = \$48,600$; $V_L = \$48,600 + (.34 \times \$12,000) = \$52,680$
47. $V_U = \$86,000 \div .10 = \$860,000$
48. $V_U = [\$150,000 \times (1 - .35)] \div .14 = \$696,428.57$; $V_L = \$696,428.57 + (.35 \times \$700\text{k}) = \$941,428.57 = \$941,429$
49. $.12 = .11 + (.11 - .08) \times D/E \times (1 - .35)$; $.01 = .0195D/E$; $D/E = .51$
50. $V_U = [\text{EBIT} \times (1 - T_c)] \div R_U = [\$1,200 \times (1 - .34)] \div .12 = \$6,600$
 $V_L = V_U + (T_c \times D) = \$6,600 + (.34 \times \$3,000) = \$7,620$
 $V_L - V_D = V_E = \$7,620 - \$3,000 = \$4,620$
 $R_E = R_U + (R_U - R_D) \times D/E \times (1 - T_c) = .12 + [(.12 - .07) \times (\$3,000 \div \$4,620) \times (1 - .34)] = .12 + .02143 = .14143 = 14.14\%$
51. $V_U = [\text{EBIT} \times (1 - T_c)] \div R_U = [\$1,600 \times (1 - .34)] \div .10 = \$10,560$
 $V_L = V_U + (T_c \times D) = \$10,560 + (.34 \times \$3,000) = \$11,580$
 $V_L - V_D = V_E = \$11,580 - \$3,000 = \$8,580$
 $R_E = R_U + (R_U - R_D) \times D/E \times (1 - T_c) = .10 + [(.10 - .08) \times (\$3,000 \div \$8,580) \times (1 - .34)] = .10 + .00462 = .10462 = 10.46\%$
52. $V_E = \$12,000 - \$5,000 = \$7,000$; $.1384 = .12 + (.12 - R_D) \times (\$5,000 \div \$7,000) \times (1 - .34)$; $.0184 = .056571 - .471429R_D$; $R_D = .08097 = 8.10\%$
53. $.138 = R_U + (R_U - .085) \times .60 \times (1 - .34)$; $.17166 = 1.396R_U$; $R_U = .12297 = 12.30\%$
54. $.1526 = .13 + (.13 - .07) \times D/E \times (1 - .35)$; $.0226 = .039D/E$; $D/E = .579 = .58$
55. $R_E = .14 + (.14 - .09) \times .60 \times (1 - .34) = .14 + .0198 = .1598 = 15.98\%$
56. Annual interest tax shield = $\$250,000 \times .07 \times .35 = \$6,125$
57. Annual interest tax shield = $2,000 \times \$1,000 \times .09 \times .34 = \$61,200$
58. Present value of the tax shield = $.34 \times \$12,000 = \$4,080$
59. $\text{WACC} = [(\$16\text{k} \div \$21\text{k}) \times .12] + [(\$5\text{k} \div \$21\text{k}) \times .08 \times (1 - .34)] = .091429 + .012571 = .1040 = 10.40\%$
60. $r_s = .10 + .60/.40(.10 - .08) = .10 + .03 = .13 = 13\%$
61. $r_{wacc} = .12 = (.6/1.6)(.08) + .625(r_s)$
 $.12 = .375(.08) + .625(X)$ $.9 = .625x$ $X = .144 = 14.4\%$
62. $r_s = 16 = r_0 + 1(r_0 - .08)$ $.16 = 2r_0 - 8$ $.24 = 2r_0$ $r_0 = .12 = 12\%$
 $\text{WACC} = r_d w_d + r_e w_e = .08(.5) + .16(.5) = .12 = 12\%$
63. $r_s = 15 + 1.2(15 - 10) = 21\%$
64. $r_s = r_{su} + (B/S)(r_{su} - r_u)$
 $r_s = .12 + 2(.12 - .08) = .0200 = 20\%$
65. $r_s = r_o + (B/S)(1 - T_c)(r_o - r_B)$

- $rs = .09 + (.4/.6) (1 - .34) (.09 - .04) = .09 + .022 = .112 = 11.2\%$
 66. $rs = ro + (B/S)(1 - Tc)(ro - rB)$
 $.16 = ro + (1) (1 - .25) (ro - .08)$ $.16 = ro + .75ro - .6$ $.22 = 1.75ro$ $ro = 12.57\%$
 67. $rs = ro + (B/S)(1 - Tc)(ro - rB)$
 $.22 = ro + (.5) (1 - .40) (ro - .16)$ $.22 = ro + .3ro .048$ $.268 = 1.3ro$ $ro = 20.61\%$
 68. $rs = ro + (B/S)(1 - Tc)(ro - rB)$
 $rs = .14 + 1.75(1 - .5)(.14 - .10) = .14 + .035 = .175 = 17.5\%$
 69. $rs = ro + (B/S)(1 - Tc)(ro - rB)$
 $rs = .16 + 1.5(1 - .4)(.16 - .10) = .214 = 21.4\%$
 70. $rs = ro + (B/S)(1 - Tc)(ro - rB)$
 $rs = .09 + 1.75(1 - .5)(.09 - .07) = .09 + .0175 = .1075 = 10.75\%$