CHAPTER 32
MEASURES OF LEVERAGE

1. (B) 5,000.

Explanation

The breakeven quantity of sales is the number of units at which the contribution margin (price minus variable cost to produce a unit) from the quantity a firm sells just covers its fixed costs.

Q_{BE} = fixed costs / (price - variable cost per unit)

Q_{BE} = 10,000 / (4.00 - 2.00) = 5,000

(Study Session 10, Module 32.1, LOS 32.d)

Related Material

SchweserNotes - Book 3

2. (B) The tradeoff between fixed and variable costs.

Explanation

Operating leverage can be defined as the trade off between variable and fixed costs.

(Study Session 10, Module 32.1, LOS 32.c)

Related Material

SchweserNotes - Book 3

3. (A) If the company has no debt outstanding, then its degree of total leverage equals its degree of operating leverage.

Explanation

If debt = 0 then DFL = 1 because DFL = EBIT/(EBIT - I)

If debt = 0 then I = 0 and DFL = EBIT/(EBIT - 0) = EBIT/EBIT = 1

DTL = (DOL)(DFL)

If DFL = 1 then DTL = (DOL)(1) which complies to DTL = DOL

A decrease in interest expense will decrease DFL, which will decrease DTL. An increase in fixed costs will increase the company's DOL.

(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

4. (B) 70,600.

Explanation

Operating breakeven quantity of sales = 1.2 million/(39 - 22) = 70,588 units.

For Further Reference:

(Study Session 10, Module 32.1, LOS 32.e)

CFA® Program Curriculum, Volume 4, page 104

Related Material

SchweserNotes - Book 3

5. (B) **Increase both the level and variability of return on equity.**

Explanation

An increase in debt will increase interest expense, which will decrease net income but not operating income, which is calculated before subtracting interest expense. For a profitable firm, the decrease in net income will be offset by the decrease in equity from the repurchase of common stock, so that ROE increases. The effect of the increase in financial leverage will, however, increase the variability of ROE for a given change in operating earnings.

For Further Reference:

(Study Session 10, Module 32.1, LOS 32.c)

CFA® Program Curriculum, Volume 4, page 97

Related Material

SchweserNotes - Book 3

6. (A) **The number of units a firm produces and sells result in a similar change in the firm's earnings before interest and taxes.**

Explanation

Operating leverage is the result of a greater proportion of fixed costs compared to variable costs in a firm's capital structure and is characterized by the sensitivity in operating income (earnings before interest and taxes) to change in sales. A firm that has equal changes in sales and operating income would have low operating leverage (the least it can be is one). Note that the relationship between operating income and net income is impacted by the degree of financial leverage, and the relationship between sales and net income is impacted by the degree of total leverage.

(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

7. (A) **$2.25.**

Explanation

40,000 = $10,000/(P - $2)

40,000P - $80,000 = $10,000

P = $90,000/40,000 = $2.25.

(Study Session 10, Module 32.1, LOS 32.d)

Related Material

SchweserNotes - Book 3

8. (C) **Business risk.**

Explanation

Business risk is the uncertainty regarding the operating income of a company. Financial risk refers to the uncertainty caused by the fixed cost associated with borrowed money.

(Study Session 10, Module 32.1, LOS 32.a)

Related Material

SchweserNotes - Book 3

9. (B) 2.20 1.08

Explanation

DOL = (sales - variable costs) / (sales - variable costs - fixed costs)
Variable costs = $3,500,000 x 45% = $1,575,000
Fixed costs = $1,050,000
DOL = ($3,500,000 - $1,575,000) / ($3,500,000 - $1,575,000 - $1,050,000) = 2.20
DFL = EBIT / (EBIT - interest)
Interest = $750,000 x 9% = $67,500
EBIT = sales - variable costs - fixed costs = $3,500,000 - $1,575,000 - $1,050,000 = $875,000
DFL = $875,000 / ($875,000 - $67,500) = 1.08
(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

10. (B) 2,500 units.

Explanation

For this problem you need 2 equations.
Break-even quantity = Fixed Costs / (Price - Variable cost)
Q = FC / (P - V)
Fixed Costs = Total Costs - Variable Costs
FC = TC - VC = 200,000 - 150,000 = 50,000
Q = 50,000 / (35 - 15) = 2,500
(Study Session 10, Module 32.1, LOS 32.d)

Related Material

SchweserNotes - Book 3

11. (B) 8,125.

Explanation

At the breakeven quantity of sales, the contribution margin (price minus variable cost to produce a unit) from the quantity a firm sells just covers its fixed costs: QBreakeven x (Price Variable Cost) = Fixed Cost.
Therefore:
$Q_{Breakeven}$ = Fixed Cost / (Price - Variable Cost)
$Q_{Breakeven}$ = $325,000 / ($160 - $120) = 8,125 units.
(Study Session 10, Module 32.1, LOS 32.d)

Related Material

SchweserNotes - Book 3

12. (C) Lower operating leverage generally results in a higher expected rate of return.

Explanation

Operating leverage is the trade off between fixed and variable costs. Higher operating leverage typically is indicative of a firm with higher levels of risk (greater income variance). Given the positive risk/return relationship, higher operating leverage firms are expected to have a higher rate of return. And, lower operating leverage firms are expected to have a lower rate of return.
(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

13. (C) **Firm B.**

Explanation

The DOL for the three companies is as follows:

DOL = (Total Revenue - Total Variable Costs) / (TR - TVC - Total Fixed Costs)

Firm A: ($4.00 - $2.00) / ($4.00 - $2.00 - $1.00) = 2

Firm B: ($4.00 - $2.60) / ($4.00 - $2.60 - $1.30) = 14

Firm C: ($4.00 - $2.40) / ($4.00 - $2.40 - $1.40) = 8

(**Note:** Interest expense does not affect operating leverage.)

(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

14. (A) **30 fewer blankets than last year.**

Explanation

To obtain this result, we need to calculate Last Year's Breakeven Quantity, This Year's Breakeven Quantity, and calculate the difference.

Step 1: Determine Last Year's (Basic Blanket) breakeven quantity:

Q_{BE} = (Fixed Costs) / (Sales Price per unit - Variable Cost per unit)

= 750 / (25 - 20) = 150

Step 2: Determine This Year's (New Blanket) breakeven quantity:

Q_{BE} = (Fixed Costs) / (Sales Price per unit - Variable Cost per unit)

= 840 / (40 - 33) = 120

Step 3: Determine Change in Units:

$\Delta Q = Q_{This\ Year} - Q_{Last\ Year} = 120 - 150 = -30.$

Korotkin needs to sell 30 fewer blankets.

(Study Session 10, Module 32.1, LOS 32.d)

Related Material

SchweserNotes - Book 3

15. (C) **$207,500.**

Explanation

Income = 31 x 25,000 - 180,000 - (25/20) x 310,000 = 207,500.

For Further Reference:

(Study Session 10, Module 32.1, LOS 32.d)

CFA® Program Curriculum, Volume 4, page 104

Related Material

SchweserNotes - Book 3

16. (A) **Using financial leverage increases the volatility of ROE for a level of volatility in operating income.**

Explanation

If a firm is financed with 100% equity, there is a direct relationship between changes in the firm's ROE and changes in operating income. Adding financial leverage (debt) to the firm's capital structure will cause ROE to become much more volatile and ROE will change more rapidly for a given change in operating income. The increased volatility in ROE reflects an increase in both risk and potential return for equity holders. Note that financial leverage results in increased default risk, but since existing bond holders are compensated by coupon interest and return of principal, their potential return is unchanged. Although financial leverage will generally increase ROE if a firm has a positive operating margin (EBIT/Sales), if the operating margin were small, the added interest expense could turn the firm's net profit margin negative, which would in turn make ROE negative.

(Study Session 10, Module 32.1, LOS 32.c)

Related Material

SchweserNotes - Book 3

17. (B) **The greater a company's business risk, the higher its optimal debt ratio.**

Explanation

The greater a company's business risk, the lower its optimal debt ratio.

(Study Session 10, Module 32.1, LOS 32.a)

Related Material

SchweserNotes - Book 3

18. (C) **200,000.**

Explanation

The operating breakeven point is the quantity of product sold at which operating income is zero (revenue equals operating cost).

F = Fixed operating cost = RMB 10,000,000

P = Price per unit = RMB 200

V = Variable cost per unit = RMB 150

Operating breakeven quantity = F / (P - V) = 10,000,000 / (200 - 150) = 200,000.

(Study Session 10, Module 32.1, LOS 32.e)

Related Material

SchweserNotes - Book 3

19. (B) **2.5 million units.**

Explanation

Operating breakeven quantity = fixed operating costs / (price - variable cost per unit) = $5 million / ($4.00 - $2.00) = 2,500,000 units.

(Study Session 10, Module 32.1, LOS 32.e)

Related Material

SchweserNotes - Book 3

20. (C) The value of the firm.

Explanation

The key to finding the optimal capital structure is identifying the level of debt that will maximize firm value. Earnings and earnings per share are not critical in and of themselves when assessing firm value, because they do not consider risk.

(Study Session 10, Module 32.1, LOS 32.c)

Related Material

SchweserNotes - Book 3

21. (A) An increase in fixed production costs.

Explanation

Operating risk refers to uncertainty about operating earnings arising from fixed production (operating) costs.

For Further Reference:

(Study Session 10, Module 32.1, LOS 32.a)

CFA® Program Curriculum, Volume 4, page 86

Related Material

SchweserNotes - Book 3

22. (B) Common equity.

Explanation

Financial risk, in the context of a firm's financing of its operations, results from taking on fixed financial obligations such as debt or operating leases. Common equity financing does not involve fixed obligations.

(Study Session 10, Module 32.1, LOS 32.a)

Related Material

SchweserNotes - Book 3

23. (C) Interest rate variability.

Explanation

Business risk can be defined as the uncertainty inherent in a firm's return on assets (ROA). While changes in interest rates may impact the demand or input prices, there is a more direct impact on business risk with the other two choices.

(Study Session 10, Module 32.1, LOS 32.a)

Related Material

SchweserNotes - Book 3

24. (A) Debt-equity ratio.

Explanation

The main factors affecting business risk are demand variability, sales price variability, input price variability, ability to adjust output prices, and operating leverage. Debt levels affect financial risk, not business (operating) risk.

(Study Session 10, Module 32.1, LOS 32.a)

Related Material

SchweserNotes - Book 3

25. (B) Higher.

Explanation

If a high percentage of a firm's total costs are fixed, the firm is said to have high operating leverage. High operating leverage, other things held constant, means that a relatively small change in sales will result in a large change in operating income. Therefore, during an expansionary phase in the economy a highly leveraged firm will have higher earnings growth than a lesser leveraged firm. The opposite will happen during an economic contraction.

(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

26. (C) The same.

Explanation

The operating breakeven quantity for the snack cakes division is $25,000/($2.00 - $1.00) = 25,000.

The operating breakeven quantity for the bread division is $30,000/($2.50 - $1.30) = 25,000.

(Study Session 10, Module 32.1, LOS 32.e)

Related Material

SchweserNotes - Book 3

27. (A) 1.25.

Explanation

The degree of financial leverage (DFL) is interpreted as the ratio of the percentage change in net income to the percentage change in EBIT. FCO can compare two EBIT forecasts to determine how net income is being driven by financial leverage.

$$DFL = \frac{(NI_1 - NI_0)/NI_0}{(RBIT_1 - EBIT_0)/EBIT_0}$$

$$DFL = \frac{(43,800 - 39,000)/39,000}{(88,000 - 80,000)/80,000}$$

$$= \frac{0.123}{0.100}$$

$$= 1.23$$

(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

28. (C) 35,000.

Explanation

Variable cost per unit is 140,000 / 40,000 = $3.50.

$$\text{Breakeven level of sales} = \frac{70,000+80,000}{7.75-3.50} = 35,294$$

For Further Reference:
(Study Session 10, Module 32.1, LOS 32.d)
CFA® Program Curriculum, Volume 4, page 104
Related Material
SchweserNotes - Book 3

29. (B) **Both will rise.**

Explanation
A higher breakeven point resulting from increased interest costs associated with debt financing increases the risk of the company. Since the risk is tied to firm financing, it is referred to as financial risk. Given the positive risk-return relationship, the expected return of the company's common stock also rises.
(Study Session 10, Module 32.1, LOS 32.b)
Related Material
SchweserNotes+ - Book 3

30. (B) **Consisting of both sales risk and operating risk.**

Explanation
Business risk is the combination of sales risk and operating risk. Business risk refers to the risk associated with a firm's operating income and is the result of uncertainty about a firm's revenues and the expenditures necessary to produce those revenues.
Sales risk is the uncertainty about the firm's sales. Operating risk refers to the additional uncertainty about operating earnings caused by fixed operating costs. The greater the proportion of fixed costs to variable costs, the greater a firm's operating risk.
(Study Session 10, Module 32.1, LOS 32.a)
Related Material
SchweserNotes - Book 3

31. (A) **5.0.**

Explanation
The percentage change in earnings that results from a 1% change in sales is a firm's degree of total leverage. Here, the percent change in EPS is ($1.50 / $1.00) - 1 = 50%, and DTL = %ΔEPS / %ΔSales = 10% / 50% = 5.0. Because this firm has no debt, its degree of financial leverage is 1.0 and its degree of total leverage equals its degree of operating leverage, which must also be 5.0.
(Study Session 10, Module 32.1, LOS 32.b)
Related Material
SchweserNotes - Book 3

32. (B) Business risk and financial risk.

Explanation

The two major types of risk affecting a firm are business risk and financial risk. Business risk is the uncertainty regarding the operating income of a company. Financial risk refers to the uncertainty caused by the fixed cost associated with borrowed money.

(Study Session 10, Module 32.1, LOS 32.a)

Related Material

SchweserNotes - Book 3

33. (B) Fixed costs are the highest portion of its expense.

Explanation

The higher the percentage of a firm's costs that are fixed, the higher the operating leverage, and the greater the firm's business risk and the more susceptible it is to business cycle fluctuations.

(Study Session 10, Module 32.1, LOS 32.a)

Related Material

SchweserNotes - Book 3

34. (A) A firm with low operating leverage has a small proportion of its total costs in fixed costs.

Explanation

A firm with high operating leverage has a high percentage of its total costs in fixed costs.

(Study Session 10, Module 32.1, LOS 32.b)

Related Material

SchweserNotes - Book 3

35. (B) 1.59.

Explanation:

First, calculate the operating results:

Opstalan	Annual Operating Results
Sales	$5,000,000
- Variable Costs[1]	2,000,000
Contribution Margin	3,000,000
- Fixed Costs	1,000,000
EBIT	2,000,000
- Interest Expense	105,000
EBT= Earnings	1,895,000

[1]Variable costs = 0.40 x 5,000,000

Second, calculate DOL = (Sales - Variable Costs) / (Sales - Variable Costs - Fixed Costs)
= 3,000,000 / 2,000,000 = 1.50

Third, calculate DFL = EBIT / (EBIT - I) = 2,000,000 / 1,895,000 = 1.06.

Finally, calculate DTL = DOL x DFL = 1.50 x 1.06 = 1.59.
(Study Session 10, Module 32.1, LOS 32.b)
Related Material
SchweserNotes - Book 3

36. (A) **Financial risk.**
Explanation
When a company finances its operations with fixed cost financing (debt), it takes on fixed expenses in the form of interest payments. The greater the proportion of debt in a firm's capital structure, the greater the firm's financial risk.
Business risk refers to the risk associated with a firm's operating income. Operating risk refers to the additional uncertainty about operating earnings caused by fixed operating costs.
(Study Session 10, Module 32.1, LOS 32.a)
Related Material
SchweserNotes - Book 3

37. (B) **3.75.**
Explanation
Sales = $100,000,000
VC of 25% of sales = 25,000,000
FC of 40,000,000 + 15,000,000 = 55,000,000
DOL= [100,000,000 - 25,000,000] / [100,000,000 - 25,000,000 - 55,000,000] = 3.75
(Study Session 10, Module 32.1, LOS 32.b)
Related Material
SchweserNotes - Book 3

38. (A) **$25,000.**
Explanation
The contribution of each unit sold to covering fixed costs is $15 - $10 = $5. Because selling 30,000 units just covers fixed costs, each additional unit sold produces a profit of $5. Profit is (35,000 - 30,000) x $5 = $25,000.
For Further Reference:
(Study Session 10, Module 32.1, LOS 32.d)
CFA® Program Curriculum, Volume 4, page 104
Related Material
SchweserNotes - Book 3

39. (C) **High financial risk and low operating risk.**
Explanation
Financial risk refers to the capital structure, while operating risk refers to the operating cost structure. A firm's capital structure is well within the control of management as to how much debt to assume. In contrast, a firm's operating cost

structure is usually driven by industry characteristics. This distressed firm's specialist would be looking for firms with capital structure problems that can be solved with an increase in equity capital and a reduction in debt financing. Changing the operating characteristics of the industry is far more challenging.
(Study Session 10, Module 32.1, LOS 32.a)
Related Material
SchweserNotes - Book 3

40. (B) Sales risk and operating risk.

Explanation
Business risk is the combination of sales risk, which is the variability of a firm's sales, and operating risk, which is the additional variability in operating earnings (EBIT) caused by fixed operating costs.
For Further Reference:
(Study Session 10, Module 32.1, LOS 32.a)
CFA® Program Curriculum, Volume 4, page 86
Related Material
SchweserNotes - Book 3

41. (B) Earnings per share variability.

Explanation
Financial leverage results in the existence of required interest payments and, hence, increased earnings per share variability. Higher debt ratios, given a fixed asset base, result in a greater earnings per share variability. Operating income is based on the products and assets of the firm and not on the firm's financing and, hence, has no impact on financial leverage. Greater financial leverage is likely to reduce taxes due to the tax deductibility of interest payments.
(Study Session 10, Module 32.1, LOS 32.c)
Related Material
SchweserNotes - Book 3

42. (C) 2.1.

Explanation
Operating earnings = EBIT = Sales - TVC - Fixed operating costs

$$DOL = \frac{\text{Sales} - \text{TVC}}{\text{Sales} - \text{TVC} - \text{Fixed operating costs}}$$

$$= \frac{\text{EBIT} + \text{Fixed operating costs}}{\text{EBIT}} = \frac{3.8 + 4.2}{3.8} = 2$$

For Further Reference:
(Study Session 10, Module 32.1, LOS 32.b)
CFA® Program Curriculum, Volume 4, page 90
Related Material
SchweserNotes - Book 3