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Lecture 2; Chapter 5
Operating and Financial Leverage
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Main Content

1. Leverage in a Business
2. Operating Leverage
3. Financial Leverage
4. Combining operating and Financial Leverage
5. Degree of Combined Leverage

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I. Learning Objectives

1. Leverage represents the use of fixed cost items to magnify the firm's result
2. **Break even analysis** allows the firm to determine the magnitude of operations necessary to avoid loss
3. **Operating leverage** indicates the extent fixed assets (plant and equipment) are utilized by the firm
4. **Financial leverage** shows how much debt the firm employs in its capital structure
5. **Combine leverage** takes into account both the use of fixed assets and debt.
6. By increasing leverage, the firm increases its profit potential, but also its risk of failure.

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2 primary decisions

1. Determine the amount of fixed cost used in production process

Installing modern sophisticated equipment OR

High volume

Low volume

Using expensive labor

Opportunity for profit

Exposure to risk

Operating Leverage

2. Determine how to finance the business

Relying on Debt OR

Relying on Equity

Financial Leverage

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Q: quantity
 P: price per unit
 $S = P * Q$
 BE: break-even
 FC: fixed cost
 VC: variable cost per unit
 $TVC = VC * Q$: total variable costs
 EBIT: earning before interest and taxes
 I: interest

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EBT: Lợi nhuận trước thuế = EBIT - I
 t: Tax rate
 EAT: Lợi nhuận sau thuế = EBT (1-t)
 D_p : Cổ tức chia cho các cổ đông ưu đãi
 P_r : Lợi nhuận dùng để chia cho cổ đông thường
 $P_r = EAT - D_p$
 EPS: earning per share (Thu nhập trên mỗi cổ phần) = P_r / S_p

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Điểm hòa vốn

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• BE:

$$BE = Q_{hv} = \frac{FC}{P - VC}$$

• S_{be} :

$$S_{be} = DT_{hv} = Q_{hv} * P = \frac{FC}{1 - \frac{VC}{P}}$$

• $time_{be}$:

S_n : number of days
Số ngày hoạt động trong kỳ

$$TD_{hv} = \frac{Q_{hv} * S_n}{Q} = \frac{DT_{hv} * S_n}{DT}$$

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Ex 1

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- ❖ Company X in 200X :
- ❖ FC = 100.000 USD
- ❖ P: 10USD/unit
- ❖ Q: 10 Unit
- ❖ TVC: 60 USD
- ❖ Cal BE, S_{be} ?

ĐẠI HỌC HOA SEN

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II. Operating Leverage

3. A more conservative approach

- More expensive variable costs may be substituted for fixed costs.
- Break-even point of this approach is lower but potential profitability of the firm may be cut into.

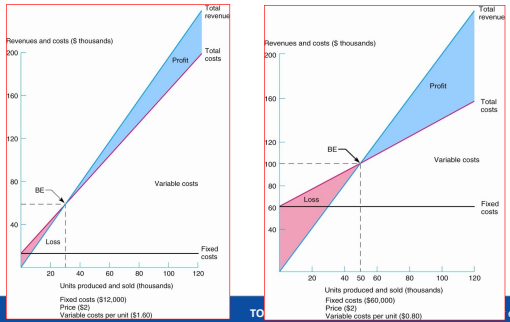
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Sau khi đạt được điểm hòa vốn thì toàn bộ định phí đã được trang trải xong. Lượng hàng tăng bao nhiêu thì tiền lời tăng bấy nhiêu. Từ đó lợi nhuận có thể được tính như sau:

$$P = EBIT = (P - VC) \times (Q - Q_{hv})$$

II. Operating Leverage

3. A more conservative approach (cont'd)



II. Operating Leverage

3. A more conservative approach (cont'd)

Units Sold	Total Variable Costs	Fixed Costs	Total Costs	Total Revenue	Operating Income (loss)
0	0	\$ 12,000	\$ 12,000	0	\$(12,000)
20,000	\$ 32,000	12,000	44,000	\$ 40,000	(4,000)
30,000	48,000	12,000	60,000	60,000	0
40,000	64,000	12,000	76,000	80,000	4,000
60,000	96,000	12,000	108,000	120,000	12,000
80,000	128,000	12,000	140,000	160,000	20,000
100,000	160,000	12,000	172,000	200,000	28,000

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4. The risk factor

- Economic condition
- Competitive position within industry
- Company's own risk-taking desires:
 - Risk averse: prefer less risk than more risk

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5. Cash break-even analysis

- Break-even analysis in terms of accounting

$$BE = \frac{\text{Fixed costs}}{\text{Contribution margin}} = \frac{FC}{P - VC}$$

→ BE = 50,000 units

- Break-even analysis in terms of cash flow

$$BE = \frac{\text{Fixed costs} - \text{Depreciation}}{\text{Contribution margin}} = \frac{FC - D}{P - VC}$$

Assuming the depreciation is \$20,000

→ BE = 33,333 units

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Ví dụ 3 : Doanh nghiệp Mỹ An chuyên sản xuất một loại sản phẩm A có số liệu như sau :

Công suất tối đa 40.000sp
 Định phí 200.000.000đ
 Biến phí 60.000đ/sp
 Giá bán 80.000đ/sp

a/ Xác định sản lượng hòa vốn, doanh thu hòa vốn, công suất hòa vốn, thời gian hòa vốn, lợi nhuận trước thuế của doanh nghiệp A. ?

b/ Nếu công ty muốn đạt lợi nhuận sau thuế là 576.000.000 thì phải sản xuất và tiêu thụ bao nhiêu sản phẩm. Thuế suất thuế TNDN là 28%.

c./Giả sử đầu năm công ty có đơn đặt hàng 20.000sp với giá 75.000đ/sp. Sau đó có 1 đơn đặt hàng 7.000sp với giá bán 65.000đ/sp. Hỏi công ty có nhận đơn đặt hàng thứ 2 hay không ? tại sao?

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6. Degree of operating leverage (DOL)

- DOL: the percentage change in operating income as a result of a percentage change in units sold.
- DOL: thể hiện quan hệ giữa tốc độ tăng (giảm) của EBIT so với tốc độ tăng giảm của DT.

$$DOL_Q = \frac{\text{Percent change in operating income}}{\text{Percent change in unit volume}} = \frac{Q(P-VC)}{Q(P-VC)-FC}$$

- Q: quantity at which DOL is computed
- P: price per unit
- VC: variable cost per unit
- FC: fixed cost

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6. Degree of Operating Leverage (cont'd)

Units	Leveraged Firm (Table 5-2)	Conservative Firm (Table 5-3)
0	\$(60,000)	\$(12,000)
20,000	(36,000)	(4,000)
40,000	(12,000)	4,000
60,000	12,000	12,000
80,000	36,000	20,000
100,000	60,000	28,000

- If Q = 80,000, at leveraged firms:
 - $DOL_{80000} = 2.7$
- If Q = 80,000, at conservative firms:
 - $DOL_{80000} = 1.6$

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- $DOL_{80000} = 2.7$

Meaning: at S= 80.000 unit, each 1% quantity sale increase 2.7% EBIT .

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- $DOL_Q = \frac{\text{percent change in operating income}}{\text{percent change in unit volume}}$
 $= \frac{\Delta EBIT / EBIT}{\Delta Q / Q}$
- $EBIT = P \cdot Q - (VC \cdot Q + FC)$
- P and FC are fixed
- $\Delta EBIT = \Delta Q \cdot (P - VC)$
- $\frac{\Delta EBIT / EBIT}{\Delta Q / Q} = \frac{\frac{\Delta Q \cdot (P - VC)}{P \cdot Q - (VC \cdot Q + FC)}}{\frac{\Delta Q}{Q}} = \frac{Q \cdot (P - VC)}{Q \cdot (P - V) - F}$

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$$DOL = \frac{(P - VC) \times Q}{(P - VC) \times Q - FC} = \frac{S - VC}{S - VC - FC} = \frac{EBIT + FC}{EBIT}$$

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HOA SEN UNIVERSITY **Ex 1** www.hoasen.edu.vn

Company	Fixed asset	FC	VC
A	The oldest	20,000,000	150,000
B	Average	40,000,000	120,000
C	Modern	60,000,000	100,000

Cal : price = 200,000 usd/unit, BE? DOL 800?

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Ex 2
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1. Shock Electronics sells portable heaters for \$25 per unit, and the variable cost to produce them is \$17. Mr. Amps estimates that the fixed costs are \$96,000.

- Compute the break-even point in units.
- Fill in the table below (in dollars) to illustrate that the break-even point has been achieved.

Sales	_____
- Fixed costs	_____
- Total variable costs	_____
Net profit (loss)	_____

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HOA SEN UNIVERSITY Ex: DOL affect Profit

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Before affect Revenue

	Company A	Company B	Company C
Revenue	10.000	11.000	19.500
Expense			
+ FC	7.000	2.000	14.000
+ VC	2.000	7.000	3.000
EBIT	1.000	2.000	2.500

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	Công ty A	Công ty B	Công ty C
Revenue	15.000	16.500	29.250
Expense			
+ FC	7.000	2.000	14.000
+ VC	3.000	10.500	4.500
EBIT	5.000	4.000	10.750
% change EBIT	400%	100%	330%

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Conclusion

Apply DOL affect increasing EBIT. However, increasing have Rule, It is decreasing

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II. Operating Leverage

7. Limitations of Analysis

- In the real world:
- Weakening of price in an attempt to capture an increasing market
- Cost overruns when moving beyond an optimum-size operation
- Relationships between revenue and cost are not fixed

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Ex3 HOA SEN UNIVERSITY www.hoasen.edu.vn

2. The Hartnett Corporation manufactures baseball bats with Pudge Rodriguez's autograph stamped on them. Each bat sells for \$13 and has a variable cost of \$8. There are \$20,000 in fixed costs involved in the production process.

- Compute the break-even point in units.
- Find the sales (in units) needed to earn a profit of \$15,000.

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- Ex2: Corporation X have: $Q = 70,000$; $P = 1000/u$; $VC = 300/u$; $FC: 30,000,000$. interest payment = 5,000,000;
- Cal DFL?

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4. Limitations to use of financial leverage

- Beyond a point, debt financing is detrimental to the firm
 - Lender will perceive a greater a financial risk
 - Common stockholders may drive down the price
- Recommended for firms that are:
 - In an industry that is generally stable
 - In a positive stage of growth
 - Operating in favorable economic conditions

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HOA SEN UNIVERSITY **IV. Combining Operating and Financial Leverage** www.hoasen.edu.vn

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$$DCL_{QoS} = DOL_{Q/S} \times DFL_{EBIT=X}$$

$$DCL_{QoS} = \frac{\% \Delta EPS}{\% \Delta S}$$

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Ex1: Corporation X have:

- Q= 70.000; P= 1000/u ; VC =300/u; FC: 30.000.000.
- interest payment= 5.000.000;
- Cal DOL, DCL?

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Ex2

- Corporation Toy have:
- P=50\$, VC: 25\$, FC: 100.000\$. Loan: 200.000\$ with interest 8%. Cal DCL 8.000

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Discussion Questions and Problems

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- -the end-

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