CHAPTER 5: OPERATING AND FINANCIAL LEVERAGE

1. OPERATING LEVERAGE

Operating leverage reflects the extent to which fixed assets and associated fixed costs are utilized in the business.

A firm's operational costs may be classified as fixed, variable, or semivariable.

- Fixed costs: Stay mostly the same no matter how many units of products or service are sold, such as insurance, management salaries, and rent or lease payments.
- Variable costs: Those that change with the number of units produced and sold, such as utilities, labor and raw materials.

1.1 Break-Even Analysis

Break-even points the point at which total cost and total revenue are equal.

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

BE: break-even point

FC: fixed costs

VC: variable cost per unit

P: price (net unit revenue)

- **Break-even quantity**

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

- **Break-even sales**

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

- **Break-even times**

$$Time_{be} = TĐ_{hv} = \frac{Q_{hv} \times S_n}{Q} = \frac{S_{be} \times S_n}{S}$$

With S_n: number of dates of operation in the period

Example

Company ABC in 2016
FC = $ 120.000
VC = $ 6/unit
P = $ 12/unit
Q = 12 units
S = $ 400,000
Calculate BE, S_{be}, $Time_{be}$?

- $BE = Q_{hv} = \frac{FC}{P-VC} = \frac{\$120,000}{\$12 - \$6} = 20,000 \text{ units}$
- $S_{be} = Q_{hv} \times P = 20,000 \times \$\,12 = \$\,240,000$
- $Time_{be} = \frac{S_{be} \times S_n}{S} = \frac{\$\,240,000 \times 365}{\$\,400,000} = 219 \text{ days}$

1.2 Operating leverage

❖ Degree of operating leverage (DOL)

DOL is the percentage change in operating income as a result of a percentage change in units sold.

$$DOL = \frac{\text{Percent change in operating income}}{\text{Percent change in unit volume}}$$

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

Q: Quantity

P: Price per unit

S: Sales

VC: Variable cost per unit

FC: Fixed cost

EBIT: Earning before interest and taxes

Conclusion: Apply DOL affect increasing EBIT. However, increasing have rule, it is increasing with decreasing trend.

Example

Corporation BABA has:
FC = $ 1,000,000
VC = $ 150/unit
P = $ 1,200/unit
Q = 110,000 units
Calculate DOL?

$$DOL = \frac{Q(P - VC)}{Q(P - VC) - FC} = \frac{110{,}000\ (\$1{,}200\ -\ \$150)}{110{,}000\ (\$1{,}200\ -\ \$150)\ -\ \$1{,}000{,}000} = 1.01$$

→ At Q = 110,000 units, each 1% quantity sale increase 1.01% EBIT.

1.3 Financial leverage

Finanial leverage reflects the amount of debts used in the capital structure of the firm.

Debt carries a fixed interest payment.

Financial leverage determines how the operation is to be financed.

❖ **Degree of financial leverage (DFL)**

DFL is the percentage change in earning (EPS) as a result of a percentage change in EBIT.

$$DFL = \frac{\text{Percent change in EPS}}{\text{Percent change in EBIT}}$$

$$DFL = \frac{Q(P - VC) - FC}{Q(P - VC) - FC - I} = \frac{EBIT}{EBIT - I}$$

Q: Quantity

P: Price per unit

S: Sales

VC: Variable cost per unit

FC: Fixed cost

EBIT: Earning before interest and taxes

I: Interest

Example

Corporation BABA has:
FC = $ 1,000,000
VC = $ 150/unit
P = $ 1,200/unit
Q = 110,000 units
I = $ 2,500,000
Calculate DFL?

$$DFL = \frac{Q(P - VC) - FC}{Q(P - VC) - FC - I} = \frac{110{,}000\ (\$1{,}200 - \$150) - \$1{,}000{,}000}{110{,}000\ (\$1{,}200 - \$150) - \$1{,}000{,}000 - \$2{,}500{,}000} = 1.02$$

→ At EBIT = $114,500,000, each 1% EBIT increasing, so EPS increase 1.02% and return.

2. COMBINED LEVERAGE

❖ Degree of combined leverage (DCL)

DCL is shows the impact of a change in sales or volume on EPS.

$$DCL = \frac{\text{Percent change in EPS}}{\text{Percent change in sales (or volume)}} = DOL \times DFL$$

$$DCL = \frac{Q\ (P - VC)}{Q\ (P - VC) - FC - I} = \frac{S - TVC}{S - TVC - FC - I} = \frac{EBIT + FC}{EBIT - I}$$

Q: Quantity

P: Price per unit

S: Sales

VC: Variable cost per unit

FC: Fixed cost

EBIT: Earning before interest and taxes

I: Interest

Example

Corporation BABA has:
FC = $ 1,000,000
VC = $ 150/unit
P = $ 1,200/unit
Q = 110,000 units
I = $ 2,500,000
Calculate DCL?

$$DCL = \frac{Q(P - VC)}{Q(P - VC) - FC - I} = \frac{110{,}000\ (\$1{,}200\ -\ \$150)}{110{,}000\ (\$1{,}200\ -\ \$150) -\ \$1{,}000{,}000 - \$2{,}500{,}000} = 1.03$$

→ At Q = 110,000 units, each 1% change in sales will be reflected in a 1.03% change in EPS at this level of operation.