

Leverage:, Operating, Financial and Total

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Degree of leverage

- The degree of leverage in a firm is calculated based on various indexes.

Some common indexes are:

- Degree of operating leverage, DOL
- Degree of financial leverage, DFL
- Degree of total leverage, DTL

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Operating Leverage

- Operating leverage** is the degree to which a firm uses fixed costs in its operations. The higher the relative fixed costs (% of total costs), the higher the firm's degree of operating leverage. In firms with high degree of operating leverage, a small change in revenues will result in a larger change in operating income because most costs are fixed.

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Variable Costing

$$Q * USP - Q * (UVC + UVE) - FC - FE = EBIT$$

UPS = Unit Sales Price, UVC = unit variable cost,
 UVE = unit variable expense, FC = fixed costs,
 FE = Fixed expenses

$$Q * [USP - (UVC + UVE)] - FC - FE = EBIT$$

$$\underbrace{Q * [USP - (UVC + UVE)]}_{\text{UCM}} - \underbrace{FC - FE}_{\text{Fixed cost}} = EBIT$$

$$\underbrace{Q * [USP - (UVC + UVE)]}_{\text{CM}}$$

Degree of Operating Leverage DOL

- Degree of operating leverage (DOL) is the percentage change in EBIT, divided by the percentage change in sales. It is a measure of the sensitivity of EBIT to changes in sales due to changes in operating expenses.

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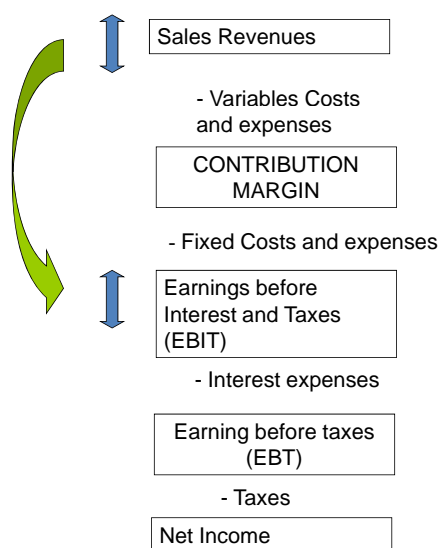
Degree of operating Leverage

$$DOL = \frac{\Delta EBIT}{\Delta Sales} = \frac{MC}{EBIT}$$

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Example

Volume of Sales in units	20,000
Unit Selling Price	\$ 10
Unit variable cost	\$ 6
Fixed Costs	\$ 5,000
Sales &Adm. Fixed Expenses	\$ 3,500

Change in sales**20%**

Sales in units	16,000	20,000	24,000
Sales in \$	160,000	200,000	240,000
Variable Costs	96,000	120,000	144,000
Contribution Margin	64,000	80,000	96,000
FC production	5,000	5,000	5,000
GF A&V	3,500	3,500	3,500
EBIT	55,500	71,500	87,500

Impact on EBIT **-22.38%** **22.38%**

DOL **1,12**

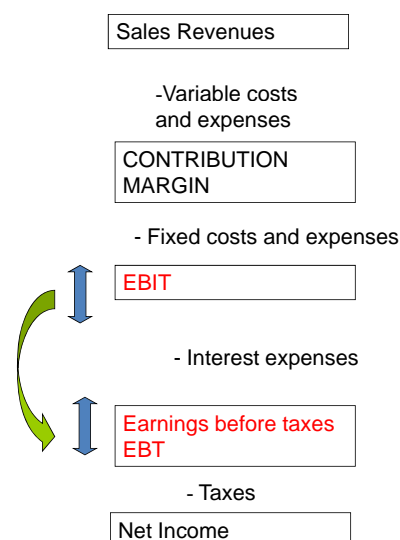
Effect on EBIT

- The effect on EBIT is an amplified effect and it goes in both ways.
- We say that there is operating leverage when the effect is larger than 1: When the firm has fixed costs, there is operating leverage.
- A mnemonic device to help in reminding DOL is that, if fixed costs are 0, and then DOL will be equal to 1.
- To have a high DOL does not mean a good financial health. If there is prosperity, to have high DOL is good, BUT in a recession it is bad.
- DOL is a measure of risk.

Financial Leverage

- Financial leverage is the degree to which a company uses fixed items, such as debt and preferred equity. A high degree of financial leverage implies high interest payments. As a result, earnings per share are negatively influenced by interest charges. The higher interest payments due to increased financial leverage, the lower Earnings per Share, EPS.

Financial risk is the risk to the shareholders caused by an increase in debt and preferred equities in the firm's capital structure. When a firm increases preferred equities and debt, interest charges increase, and EPS are reduced. As a result, risk to shareholder return increases. A firm should take into account its "optimal capital" structure when making financing decisions to make sure any increases in preferred equity and debt increase the value of the firm.



DFL = $\frac{\text{percentage change in EPS}}{\text{percentage change in EBIT}} = \frac{\text{EBIT}}{\text{EBIT} - \text{interest charges}}$

Degree of Financial Leverage

- This is the percentage change in EPS divided by the percentage change in EBIT. This is the "degree of financial leverage" (DFL). It is a measure of the sensitivity of EPS to changes in EBIT as a result of changes in debt. It can be seen as a sort of elasticity.
- A mnemonic device to help in reminding DFL is that, if interest is 0, DLF will be equal to 1.

$$\text{DFL} = \frac{\% \text{ EPS}}{\% \text{ EBIT}} = \frac{\text{EBIT}}{\text{EBIT} - \text{interest charges}}$$

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Degree of financial leverage DFL

$$\text{DFL} = \frac{\Delta \text{EBT}}{\Delta \text{EBIT}} = \frac{\text{EBIT}}{\text{EBT}}$$

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Example Degree of Financial Leverage

- A firm has annual sales of \$8 million. The firm's gross margin is 60%, and fixed costs are \$3 million. The firm's annual interest expenses are \$100,000. If we increase EBIT by 25%, how much will the company's EPS increase?

The company's DFL is calculated as follows:

$$\text{DFL} = \frac{(\$8 - \$3.2 - \$3)}{(\$8 - \$2.2 - \$3 - \$0.1)}$$

$$\text{DFL} = \$1.8 / \$1.7 = 1.059$$

If EBIT increases by 20%, the DFL indicates EPS will increase to 21.2% (20% × 1.059 = 21.2%)

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Example

Debt	100,000
Interest	2%
Taxes	40%
Number of common shares	2,000

EBIT	55,500	71,500	87,500
Interests	2,000	2,000	2,000
EBT	53,500	69,500	85,500
Taxes	21,400	27,800	34,200
Net Income	32,100	41,700	51,300
EPS	16.05	20.85	25.65
Impact on EPS	-23,02%		23,02%
DFL	1,03		

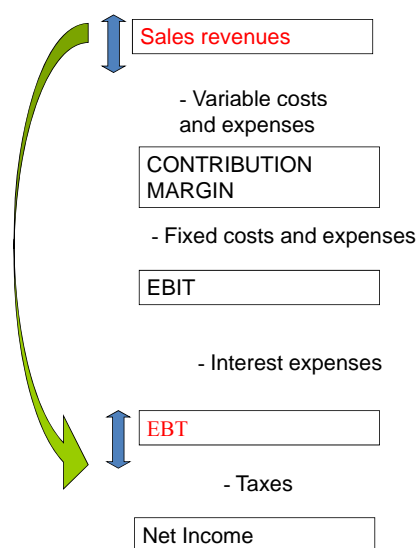
Degree of Total Leverage DTL

- Combining DOL with DFL we obtain the degree of total leverage (DTL). If a company has a high DOL and DFL, a small change in sales will lead to a large change in EPS.

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Degree of Total Leverage

$$DTL = \frac{CM}{EBT} = DOL \times DFL$$

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Homework

- Companies A and B have the following Income Statements :

Sales	4,000	4,000
Variable Costs	2,000	2,000
Contribution Margin	2,000	2,000
Fixed costs	1,000	0
EBIT	1,000	2,000
Interests	\$ 0	1,000
EBT	1,000	1,000

- If taxes are 30% and the number of shares is 600.
 - Calculate the different leverages and explain.
 - Which firm is in better financial shape?