7

Leverages and Capital Structure

Learning Objectives

- *To know the relationship of CAPM and cost of equity*
- *The learn the association of beta and leverages*
- *To study financial leverage, operating leverage, and combined leverage*
- *To observe the impact of EPS and EBIT on Leverages*
- *To understand the concept and significance of capital structure*
- *To review basic theories of capital structure.*

7.1 Risk and Return: CAPM

In the preceding chapters, we have learnt that there is a positive relationship between risk and return. This relationship explains that more risk yields more return. The risk significantly affects investment opportunities, and even more important, the owners' wealth. The basic theory of risk and return is commonly called the capital asset pricing model (CAPM). CAPM is also used to determine the cost of equity. The cost of equity determined in previous chapter is based on EPS and Market Price of the Share. It is to emphasized that no risk has been considered in determining the value of cost of equity, though equity carries highest degree of risk. CAPM takes into account the riskiness of

an investment relative to market. The formula of CAPM is given below:

$$E(Ri) = Rf + \beta i * [E(Rm) - Rf]$$

Where,

$E(Ri)$ = Expected return on asset i

Rf = Risk free rate of return

βi = Beta of asset i

$E(Rm)$ = Expected market return

A graphical presentation of CAPM model has been shown in Figure 7.1 below.

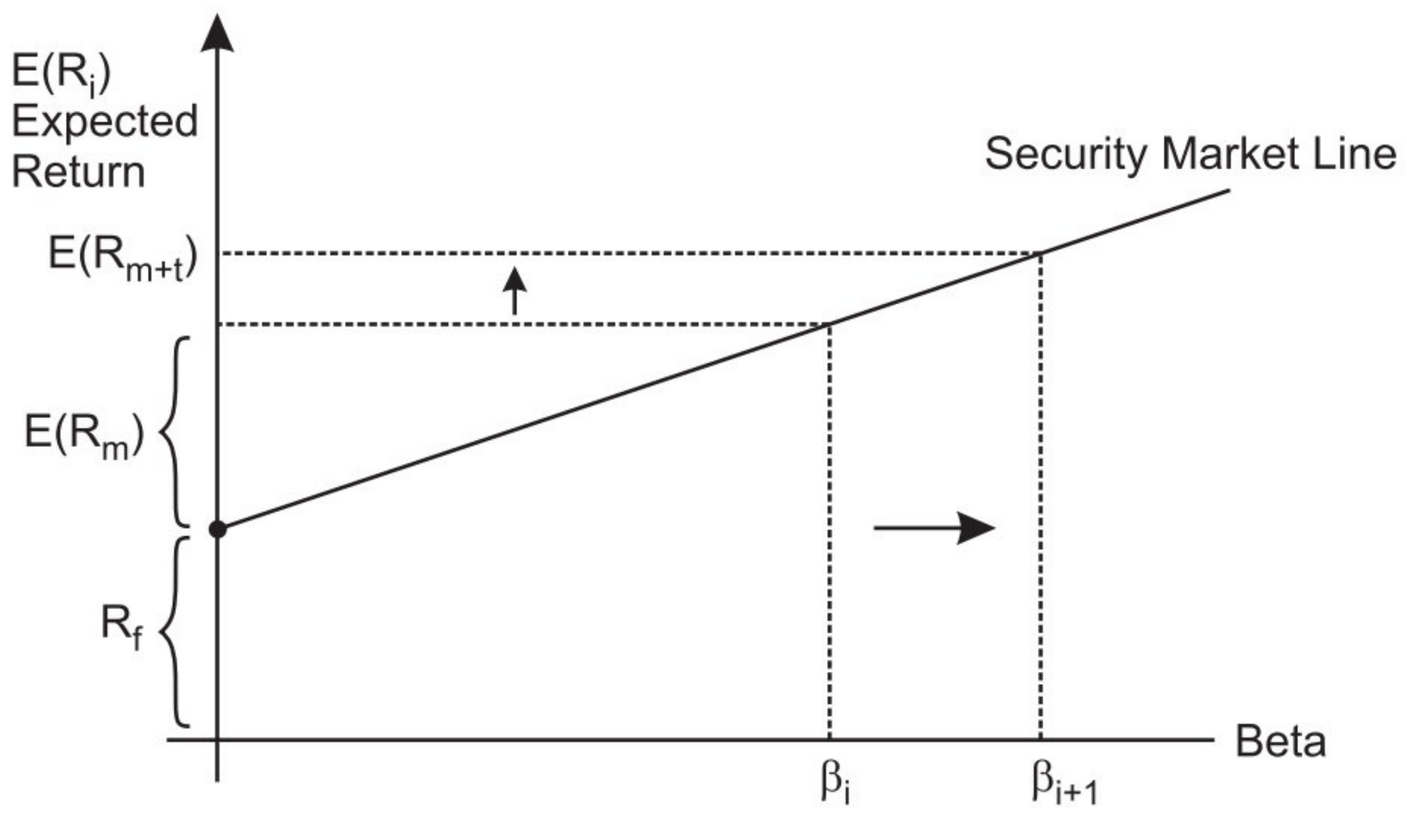

Figure 7.1: CAPM Model

Expected return from the equity, *E(Ri),* is shown on vertical axis, and risk on equity i.e., beta, '*βi'* is on horizontal axis. The security market line does not start from point of origin rather from a point above than that '*E(Rf)*' which shows minimum return on equity or risk-free rate of return. Beyond to the point of risk-free rate of return, the expected return becomes the function of beta, i.e., is more risk more return. When beta is *βi* the expected rate of return on equity was *E(Rm)*, as the degree of beta increases from *βi* to *βi+1,* the level of expected return also increased from *E(Rm)* to *E(Rm+1)*. The return beyond *Rf,* is called risk premium on a given security. On the other hand, beta indicates the risks associated with security or group of securities. The Security Market Line (SML) establishes the relationship between beta and expected return on equity. SML is average expected return of market expectations on a given level of beta.

7.2 Assumptions of CAPM

CAPM is an equilibrium model of the trade-off between expected portfolio return and unavoidable risk. There are following assumptions of CAPM:

1. Capital markets are efficient where investors are well informed.
2. Transactions cost to make investments in different securities are zero.
3. There are negligible restrictions on investment and no taxes.
4. The situation of market is alike perfect competition, and no investor is large enough to affect the market price of the stock.

5. All investors have homogeneous expectations about the expected returns and risks of securities. And the expected returns and risks thereon are based on a one-year ownership (or holding).
6. Investors are assumed to prefer higher return. At the same time, they are averse to risk, preferring lower risk.
7. Investors are assumed to measure return using the expected value and risk using the standard deviation.

Under these conditions, all investors will perceive the opportunity set of risky securities in the same way and will draw their efficient frontiers in the same place.

7.3 Estimation of Cost of Equity with CAPM

Thus, CAPM quantifies the relationship between risk and required return in a well-functioning market. CAPM may be used in estimation of cost of capital, as it helps in determining expected return on a given beta i.e., degree of risk. The application of CAPM in determination of cost of equity has been explained through Figure 7.2.

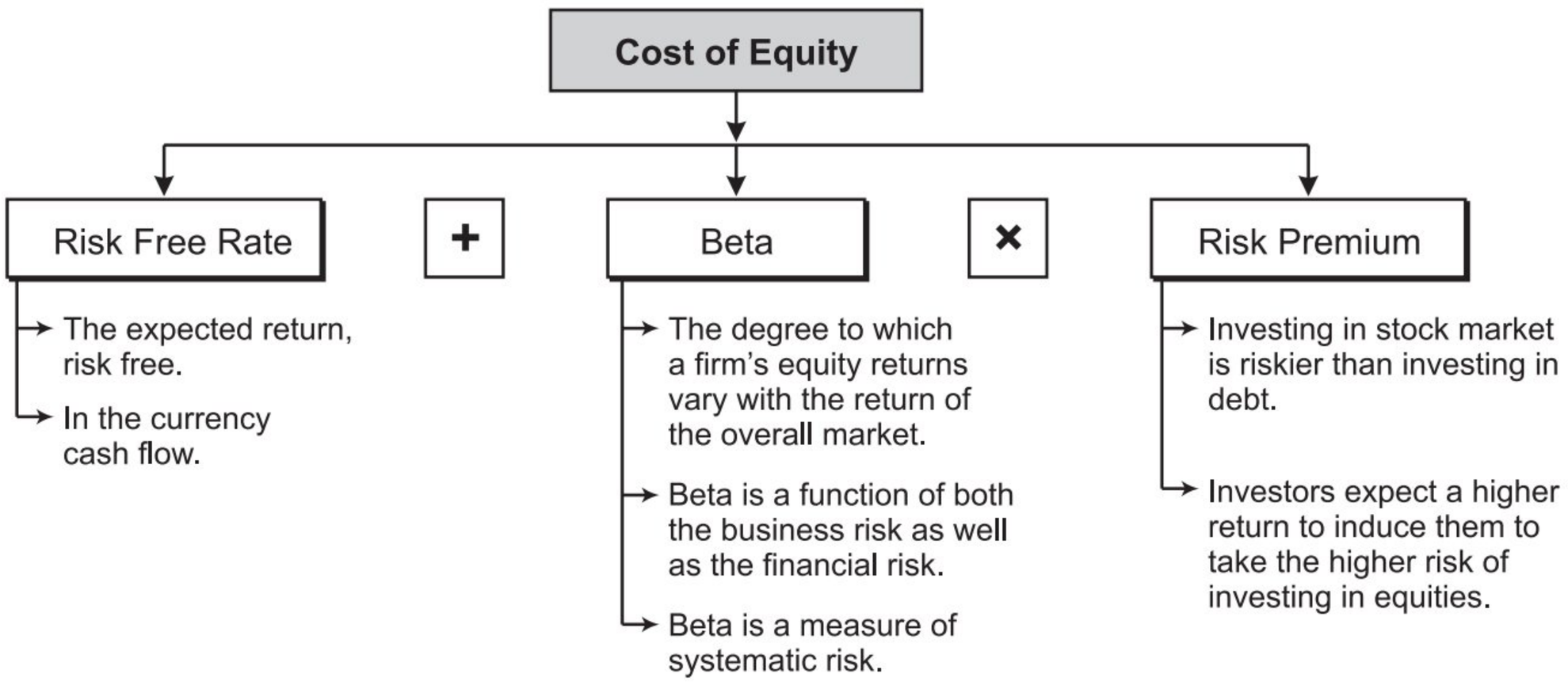

Figure 7.2: CAPM in Determining Cost of Equity

Figure 7.2 shows the components of cost of equity from the point of view of CAPM relationship of beta and risk premium. The risk premium is the difference of expected return on market *less* risk-free rate of return. Beta is a measure of systematic risk. It shows the degree to which a firm's equity returns vary with the return of the overall market. Beta is a function of both the business risk as well as the financial risk. In next section of this chapter, we will study these both types of risk, business and financial, and their combined affect.

7.4 Business Risk: Operating Leverage

The business risk is concerned with the sensitivity or variability of EBIT; it is the risk of being unable to cover operating costs. Let's understand, what is operating cost, first? Every firm run its business to earn profits. The profit is the outcome of generating revenues (sales) after deducting all operating expenses. It is to emphasized

that expenses in nature of operating expenses are to be deducted from revenues, or in other words, non-operating expenses are not to be deducted from revenues.

Operating expenses refer to expenses incurred in order run operations of business. From the income statement of a firm, operating expenses can be easily traced out given the nature of business of that particular firm. For example, a firm dealing in textile business, the operating expenses are purchase of raw material (cotton bales, threads), direct wages to labour, direct expenses on production, carriage inwards & outwards, depreciation of plant & machinery, salary to administrative staff, office rent etc. After deducting operating expenses from revenue, we get operating profits which is also called Earnings before Interest and Taxes (EBIT). A glimpse of operating profits or EBIT calculation has been shown in Table 7.1.

Table 7.1: Calculation of EBIT

Sales Revenue	XXX
Less: Cost of goods sold	(XXX)
Gross Profits	XXX
Less: Operating Expenses	(XXX)
Operating Profits or EBIT	**XXX**

It is also important to make it clear that operating expenses are sum of two types of expenses *viz.*, variable expenses and fixed expenses. Variable expenses are those expense which vary with the level of output, e.g., the requirement of raw material is directly connected with the level of output. A higher level of output requires more material and vice-versa. The variable cost is directly proportionate to output. On the other hand, fixed costs do not change, generally, with the level of output. For example, payment of salary to office staff is not connected with level of production. Irrespective of units of goods produced, or services rendered, the salary has to be paid to staff. On plotting, total revenue, total operating expenses on graph, it would create a relationship as shown in Figure 7.3 below.

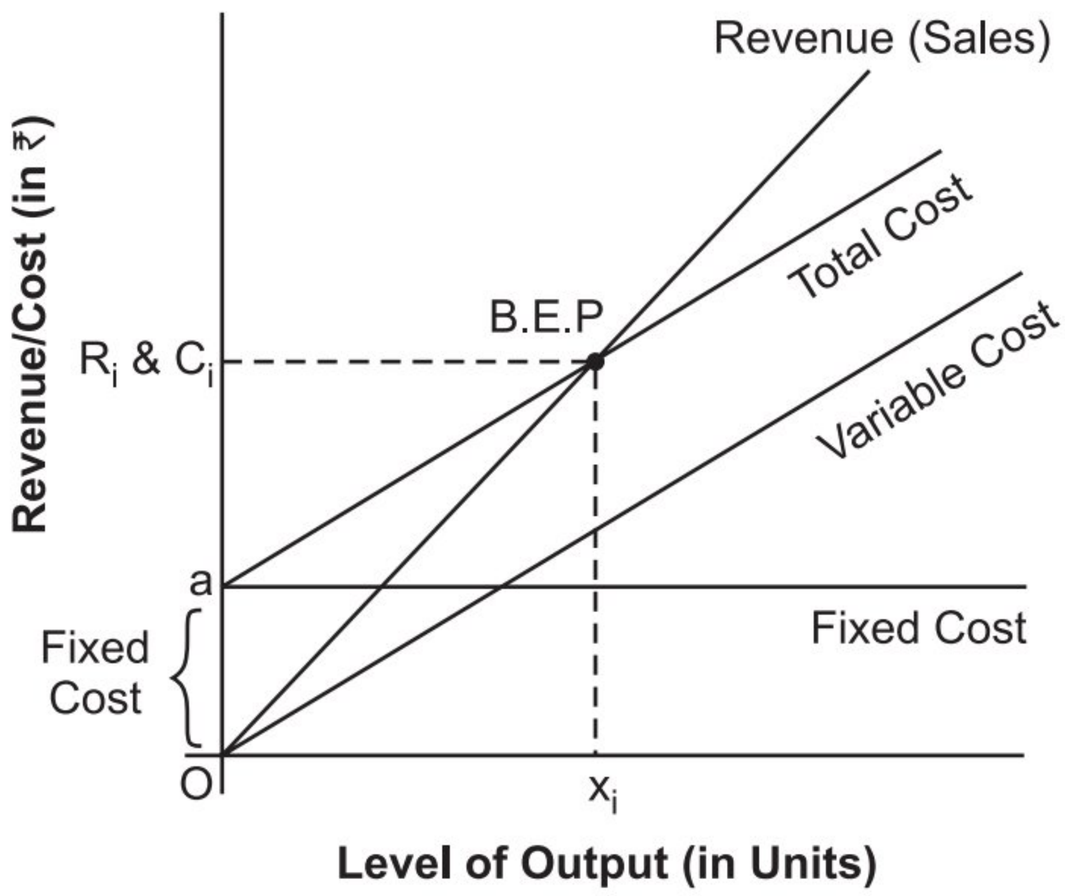

Figure 7.3: Relationship of Costs & Revenue — BEP

On horizontal axis, the level of output (in units), and on vertical axis, revenue and costs are scaled. The line parallel to horizontal axis is of fixed cost which shows no change in cost at different level of output. The line starting from point 'a' is total variable cost which includes fixed as well as variable cost, thus it is parallel to variable cost line. The line starting from point of origin and intersecting the total cost line representing revenue of the firm. The intersecting point is break-even point (B.E.P) at which there is no loss and no profit. Below BEP the area covered is of loss, and above BEP it signifies operating profits.

Let assume the total units of production	=	U
Sale Price (per unit)	=	P
Sale Revenue	=	P × U
Fixed Operating Cost	=	F
Variable Operating Cost (per unit)	=	V
Variable Operating Cost (total)	=	V × U
Contribution (per unit) say C	=	P – V [Sales price – Variable cost]

The plotted graph can be used to calculate operating profits in the form of algebraic terms, as given above, Table 7.2.

Table 7.2: Operating Break-Even Analysis

Sales Revenue	P × U
Less: Fixed Operating Costs	(F)
Less: Variable Operating Expenses	(V × U)
Operating Profits or EBIT	**EBIT**

$$EBIT = (P \times U) - F - (V \times U)$$

Or,
$$EBIT = U(P - V) - F$$

At break even point, EBIT is equal zero, i.e., no profit no loss, and total cost = total revenue, therefore,

$$U = \frac{F}{P - V}$$

Now, from the above discussion, it can be observed that a firm's operating break even point or EBIT is sensitive to number of factors, viz., fixed cost, sale price per unit, and variable cost per unit. Any change in these factors will lead to change in EBIT. For example, an increase in fixed cost, or variable cost will increase the level of EBIT and vice-versa. And an increase in unit sales price of the product of the firm decreases the level of EBIT.

Illustration 1: A firm wants to check the effects of increase or decrease in fixed cost on operating profits or EBIT in following situations.

S. No.	Sale Price (p.u.) (₹)	Variable Cost (p.u.) (₹)	Fixed Cost (₹)
1	10	5	5000
2	10	5	6000
3	10	5	4000
4	9	4	5000
5	10	4	6000

Solution:

S. No.	Sale Price (p.u.) (₹)	Variable Cost (p.u.) (₹)	Fixed Cost (₹)	EBIT (in units)	EBIT (in ₹)
A	B	C	D	E = D/(B-C)	F = E (B-C) – D
1	10	5	5000	1000	0
2	10	5	6000	1200	0
3	10	5	4000	800	0
4	10	4	5000	833	0
5	10	4	6000	1000	0

From illustration 1, it can be observed that an increase in fixed costs increases the level of EBIT break-even level. This shows that firm has to increase its production level in order to gain same level of profits in case of increase in fixed costs. The same relationship of EBIT and other factors can be understood with the help of following Table 7.3, taking the reference of Table 7.2.

Table 7.3: Effect of Changes in Revenue and Costs on EBIT

S. No.	Sales Price (p.u.)	Variable Cost (p.u.)	Fixed Cost	EBIT
1.	Constant	Constant	Increase	Decrease
2.	Constant	Constant	Decrease	Increase
3.	Constant	Increase	Constant	Decrease
4	Constant	Decrease	Constant	Increase
5	Increase	Constant	Constant	Increase
6	Decrease	Constant	Constant	Decrease

It may be observed that an increase in costs increase the risk of having lower EBIT. In other words, the existence of fixed operating cost in the firm's income-stream magnify the effects of changes in sales on EBIT. This effect is known as operating leverage. In other words, **operating leverage** is the fraction of a firm's costs that are fixed. Firms with a lower fraction of variable costs and a higher fraction of fixed costs have a higher operating leverage, which means in case of declining sales, a higher amount of cost can not be decreased, thereby increase in risk of loss.

Operating leverage affects a firm's risk, as it can magnify earnings both up and down. The bigger the leverage, the more volatile the firm's future earnings and cash flows, and the greater the discount rate applied in the firm's valuation of securities. From the

point of view of cost of securities, business risk, measured by operating leverage, is the variability about projections of future operating earnings and a determinant of cost of capital.

Degree of Operating Leverage (DOL)

The degree of operating leverage (DOL) can be measured using the following equation.

$$DOL = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in Sales}}$$

Whenever the percentage change in EBIT resulting from a given percentage in sales is greater than the later, operating leverage exists. Whenever DOL = 1 it shows break-even situation. As long as DOL is greater than one, i.e., DOL > 1, there is operating leverage.

Further, a firm with higher fixed operating costs relative to variable operating cost results into greater the degree of operating leverage. Since leverage works both ways, it magnifies losses as well as gains. The shift in cost structure towards more fixed costs tends to increase the magnitude of potential losses, hence increased risk. In order to maintain same level of profitability firm has to increase its production level. Higher the break-even point, the greater the degree of business risk, resulting in higher cost of capital.

Illustration 2: X Co. Ltd provides you the brief income and expenditure details for three years. You are required to compute operating leverage and comment on operating risk of the company.

Particulars	**Year 2017 Amount in (₹)**	**Year 2018 Amount in (₹)**	**Year 2019 Amount in (₹)**
Sales (in units)	2000	2200	1900
Sale Price per unit	300	300	300
Variable cost per unit	150	150	150
Fixed operating cost	200000	200000	200000

Solution:

Particulars		**Year 2017 Amt. in (₹)**	**Year 2018 Amt. in (₹)**	**Year 2019 Amt. in (₹)**
Sales (in units)	A	2000	2200	1900
Sale Price per unit	B	300	300	300
Total Revenue (A*B)	C	600000	660000	570000
Variable cost per unit	D	150	150	150
Less: Total Variable Cost (A*D)	E	(300000)	(330000)	(285000)
Contribution (A-E)	F	300000	330000	285000
Less: Fixed operating cost	G	(200000)	(200000)	(200000)
EBIT (operating profit) (F-G)	H	100000	130000	85000

Particulars		Year 2017 Amt. in (₹)	Year 2018 Amt. in (₹)	Year 2019 Amt. in (₹)
% Change in EBIT			$\frac{30000}{100000} = 30\%$	$\frac{45000}{130000} = 34.6\%$
% Change in Sales			$\frac{60000}{600000} = 10\%$	$\frac{90000}{660000} = 13.6\%$
Degree of Operating Leverage = $\frac{\text{Percentage change in EBIT}}{\text{Percentage change in Sales}}$				
DOL			$\frac{30\%}{10\%} = 3.0$	$\frac{34.6\%}{13.6\%} = 2.54$

It can be concluded that an increase in sales of 10% (from year 2017 to 2018) has been magnified by DOL by 300% but a decrease in sales by 13.6% has been inflated and shown as 254% by DOL. A decline in operating leverage shows increase in business risk of the firm.

7.5 Financial Risks: Financial Leverage

Financial risk is another component to determine beta value of cost of equity or expected return on equity. As we have discussed that cost of equity refers to proportion relation of earnings per share to market price of the share. The earnings per share (EPS) is a function of availability of profit percentage to equity shareholders (EBIT) to number of equity shares. It can be explained with income statement approach as shown in Table 7.4 below.

Table 7.4: Calculation of Earnings Per Share (EPS)

Sales Revenue	XXX
Less: Cost of goods sold	(XXX)
Gross Profits	XXX
Less: Operating Expenses	(XXX)
Operating Profits or EBIT	**XXX**
Less: Interest on debt securities	(XXX)
Earnings before Taxes (EBT)	XXX
Less: Taxes	(XXX)
Earnings after Taxes (EAT)	XXX
Less: Dividend on Preference Share Capital	(XXX)
Earnings available for Equity Shareholder	**XXX**

From above Table 7.4 it can be summarised that interest on debt securities is a fixed charge on EBIT even in case of low profit or losses. Thus, the portion of earnings after

tax will decline with increase in every single instrument of debt security on a given EBIT that remain same. But on the same time, debt has tax adjustment advantage which does not prevail in case of equity. Now, if a firm increase its equity in a given capital structure by reducing debt securities, the resultant earnings after tax will not increase in same proportionate as percentage declines in debts due to tax adjustments.

The same case can be presented through equation as given below.

$$FL = \frac{EBIT}{EBT}$$

The financial leverage after tax may be computed in following manner:

$$FL = \frac{EBIT}{(EBIT - I) \times (1 - t) - PD}$$

Where,

EBIT = earnings before interest and tax

I = interest on debts, or fixed charge on EBIT

PD = dividend on preference share capital

T = rate of corporate tax.

The above formula assume that no change is found in EBIT or EBIT is at base level at combination of equity and capital. Let's discuss with the help of an illustration.

Illustration 3: Compute Earnings available to equity shareholders in following cases.

	Situation	**Situation 2**	**Situation 3**
Equity Share Capital (₹10 each)	500000	450000	200000
10% Debenture (₹10 each)	300000	350000	600000
EBIT	200000	200000	200000
Tax Rate	30%	30%	30%

Solution:

		Situation	**Situation 2**	**Situation 3**
Equity Share Capital (₹10 each)	a	500000	450000	200000
10% Debenture (₹10 each)	b	300000	350000	600000
Number of equity shares	c	50000	45000	20000
Interest on Debenture	d	30000	35000	60000
EBIT	e	200000	200000	200000
Less: Interest on Debenture	d	(30000)	(35000)	(60000)
Earnings before Tax (e – d)	f	170000	165000	140000
Tax Rate	g	30%	30%	42000
Tax amount (f*g)	h	51000	49500	98000
Earnings for equity shareholders	i	119000	115500	20000
DFL = e/(e – d) × (1 – t)		3.22	3.65	9.1

From above illustration, it can be observed that an increase in debt securities decreases the amount of profit available to equity shareholders after tax. It is also a fixed financial charge on the firm' income. These fixed charges do not vary with the firm's EBIT, they must be paid irrespective of the amount of EBIT available to pay them. Thus, equity shareholders reduce their part of profit by allowing more debt into capital structure, and resultantly increased their financial risk. This process is known as financial leverage. Thus, use of debt in financial structure of a firm is known as financial leverage.

Financial Leverage

Financial Leverage is defined as the firm's ability to use fixed financial charges to magnify the effects of changes in earnings before interest and taxes on the firm's earnings per share. The financial leverage is also known as trading on equity. Hence, the degree of financial leverage (DFL) is proportionate of change in earnings after tax and change in EBIT. Since, financial leverage increases the firm's financial risk, therefore it will increase the risk of equity capital. Beta indicates the risk of equity capital.

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

Graphical Presentation of Financial Leverage

There are two ways to show financial leverage on a graph, first, taking change in EPS divided by change in EBIT. Second, by showing equity capitalization on graph along with fixed financial charges.

Financial leverage of a firm can be presented on a graph taking EBIT and EPS on horizontal and vertical axis respectively, as shown in Figure 7.4.

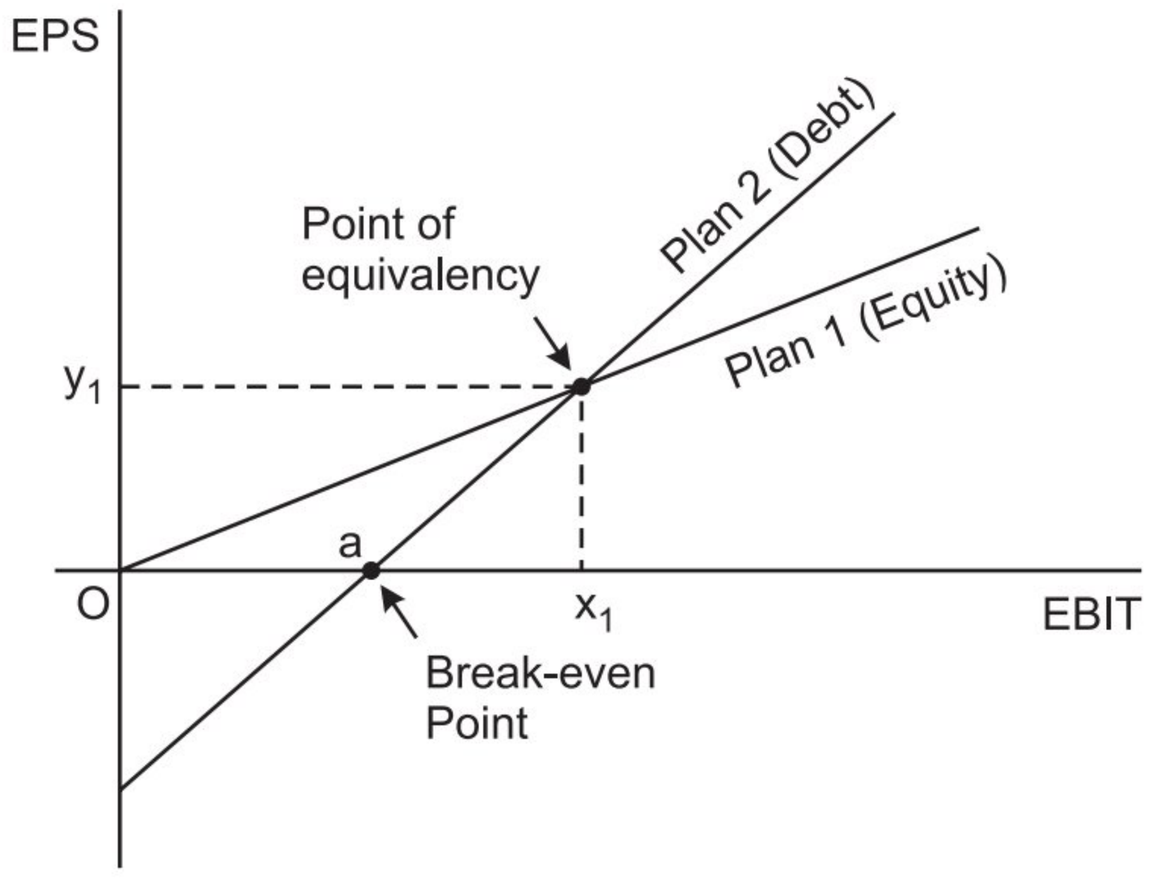

Figure 7.4: Financial Leverage or Trading on Equity

The figure 7.4 shows that a change in EBIT tends to change in EPS. There are two financial plans *viz.*, plan-1 which is equity oriented, it shows as the EBIT increases

there is increase in EPS. Since there is no requirement of payment of financial fixed cost, i.e., interest on debts, therefore, the capital line start from point of origin. On the other hand, plan-2 is debt oriented, which shows a negative balance of earnings where line of plan-2 intersect horizontal axis shows fixed interest payment on debt securities. The point 'a' indicates break-even point of capital line (plan 2) which consist debt also. The area below point 'a' depicts low level of EBIT which is not sufficient to pay fixed interest charge. The point 'a' is financial break-even point. A point of intersection is called point of equivalency where EPS under both plans are equal to each other.

Another way to indicated trading on equity may be presented in the manner as shown in figure 7.5 shown below.

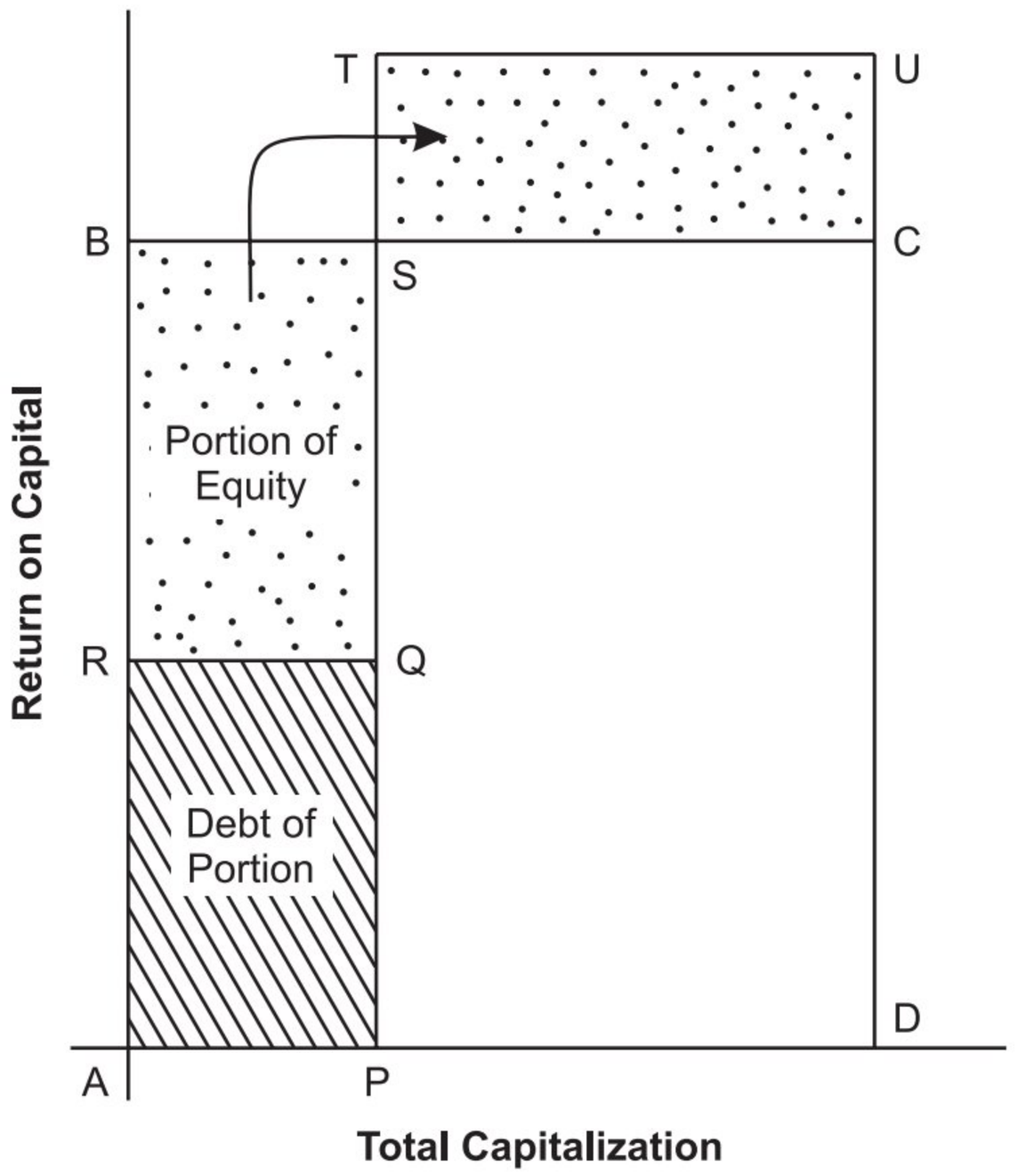

Figure 7.5: Trading on Equity

On the horizontal axis total capitalisation of equity is shown, and on vertical axis the rate of return on equity is depicted. The area shown by rectangle ABCD is the product of the rate of return on capital and the amount of capital contribution of different source of finance. The area APQR shows debt portion of the total financial structure, and area occupied by RQSB is of portion of equity. Any amount above the fixed interest benefits equity shareholders. This area has been shown in the diagram by transferring the area above the fixed charges to an equal area based on the amount of equity which increased the effective return on the equity capital and indicates trading on equity. The horizontal rectangle STUC indicates the rate of trading on equity, larger the portion of debt reduces amount of earnings available to equity shareholders thereby increase in trading on equity.

Illustration 4: A Co. Ltd. has 20000 equity shares in its capital structure, carrying ₹40000 as fixed interest on debenture. The tax rate is 50%. Compute degree of financial leverage of the cases given below.

	Situation 1	Situation 2
EBIT	100000	150000
Interest on Debentures	40000	40000

Solution:

	Situation 1	Situation 2
EBIT	100000	150000
Interest on Debentures	40000	40000
EBT	60000	110000
Tax	30000	40000
EAT	30000	70000
EPS = EAT / Number of shares	1.5	3.5
FL = EBIT / EBT	1.67	1.37
Degree of Financial Leverage	$DFL = \frac{\text{Percentage change in EBT}}{\text{Percentage change in EBIT}}$ $= \frac{(110000-60000)/60000}{(150000-100000)/100000} = \frac{0.834}{0.5} = 1.67$	

Financial leverage, like operating leverage, works in both directions, magnifying the effects of increases and decreases in the firm's EBIT, higher levels of risk are again attached to higher degrees of leverage. High fixed financial costs thus increase the firm's financial leverage, hence financial risk. The financial risk is the risk of being unable to cover financial costs. Increasing financial leverage results in increasing risk, since increased financial payments require the firm to maintain a higher level of EBIT in order to stay in business. At the same time, the risk associated with the returns grows because of the higher levels of EBIT necessary for the firm to survive. Once EBIT greater than the minimum needed for survival are reached, the benefits of financial leverage begin; as long as the firm meets its fixed financial charges, the rewards to the owners will be greater than they otherwise would have been. Thus, an optimum level of debt/equity portion and EBIT are the critical to maintain.

7.6 Difference between Operating Leverage and Financial Leverage

Followings are the key differences in operating leverage and financial leverage:

Basis	Operating Leverage	Financial Leverage
Activity	Operating leverage is an activity of business operations. The cost, including variable and fixed charge, and sales relationship represents that OL is an operational activity.	Financial leverage (FL) is associated with financing activities, as fixed charge of debenture in relation to equity capital relates to financing activity.

Basis	**Operating Leverage**	**Financial Leverage**
Focus	OL is much revolved around fixed operating expenses.	FL focuses on cost of equity and share in profit of equity subject to availability of earnings after meeting out financial charge, i.e., interest.
Formula	$OL = \frac{\text{Contribution}}{\text{EBIT}}$	$FL = \frac{\text{EBIT}}{\text{EBT}}$
Ability	It represents the ability to use fixed operating cost.	It represents the relationship between EBIT and EPS.
Trading on equity	OL has no direct impact on Trading on equity, however, it effects cost of equity.	FL has direct impact on Trading on Equity, moreover, FL is also known as Trading on Equity.
Degree	A percentage change in EBIT resulting from a percentage change in sales is called degree of OL.	A relationship between percentage change in EBT and percentage change in EBIT is FL.
Factors	Sale price (p.u.), variable cost, and fixed costs are the main factors of OL. Any change in any of three leads to change in OL.	Interest on debt securities, and EBIT are the important factors to determine FL.
Tax	The rate of tax has no role in determining OL.	The tax adjustment on interest on debt securities is the critical function of FL, any change in tax rate affects EAT, and EPS.
Risk	Operating risk is the resultant outcome of OL.	Financial risk is the final outcome of FL.
Break even	When operating cost is equal to operating profits.	When EBIT is equal to amount of interest to be paid on debt securities.

7.7 Combined or Total Risk

The total effect of operating and financial leverage is called combined leverage. The combined leverage (CL) may be defined as the firm's ability to use fixed costs, both operating and financial, to magnify the effect of changes in sales on the firm's earning per share. The combined leverage can be measured with the help of following equation.

$$CL = OL \times FL$$

$$CL = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{Contribution}}{\text{EBT}}$$

Where,

CL = Combined leverage

EBIT = Earnings before Interest and taxes

Contribution = Sales – Variable Cost

EBT = Earnings before taxes.

Degree of Combined Leverage

The percentage change in a firm's earning per share (EPS) results from one percent change in sales. This is also equal to the product of firm's degree of operating leverage and degree of financial leverage at a particular level of sales.

$$\text{Degree of Combined Leverage} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in sales}}$$

7.8 Capital Structure

We have learnt in the previous chapters that finance is an essential factor, amongst other, to run business. A lack of sufficient funds may suffer business operations only, but funds arranged in an arbitrary manner suffer the firm as a whole. There are different sources of finances, e.g., equity, preference share capital, and debts, constituting financial structure of a firm. We have also observed that cost of capital of each source of fund is different, and in combination of all make weighted average cost of capital of the firm. The proportions of equity, preference share capital, and debt on a firm's Balance Sheet is called capital structure.

Capital structure is an important area of decision making that had direct impact on cost of capital, capital budgeting decisions, and market value of the firm. In other words, capital structure is determined by the mix of long-term debt and equity a firm utilized in financing it operations. As it has direct link to share price, the financial manager must carefully monitor capital structure to maximise the wealth of stakeholders. A wise decision on capital structure may make addition to wealth, and vice-versa. Capital structure fundamentals, the concept of an optimal capital structure, approach to analyse alternative capital sources mix to form an optimal capital structure are discussed here under.

7.9 Capital Structure: Concept and Assumptions

Capital structure is one of the most complex areas of financial decision making. In simple words, capital structure is the proportions of debt instruments, preference share capital, and equity share capital on a company's Balance Sheet. Since, a capital structure is the combinations of different securities, therefore a prerequisite to effective capital structure decision is the ability to assess the firm's capital structure and to understand its relationship to risk, return, and value. A decline in one type of fund may increase demand of other source of fund in order to remain total funds unchanged. But any change in combination also affects cost of capital of the firm which raise the necessity of studying capital structure.

Assumptions of Capital Structure

1. There is no corporate tax or income tax on firm. There is no transaction cost to issue any security.

2. The ratio of debt to equity for a firm is changed (i) when new shares are issued to pay off debt, or (ii) issuing debt to repurchase securities.
3. The firm has a policy of paying 100 percent of its earnings as dividends.
4. All the investors in the market have same expectation on future operating earnings for each company in the industry.
5. The operating earnings of the firm are not expected to grow.

Following the above assumptions, the cost of capital is computed for all capital components, viz., debt, and equity. A detailed discussion has been made in the preceding chapter on cost of capital. To recapitulate, basic costs of capital functions are reproduced below.

$$\text{Cost of Debt } (K_d) = \frac{\text{Annual interest charges}}{\text{Value of debt}}$$

$$\text{Cost of Equity } (K_e) = \frac{\text{Earnings per Share}}{\text{Market value of Share}}$$

A combination of debt and equity, in the Balance Sheet, represents the total capital of a firm, as shown below with the help of following equations.

$$\text{Overall Cost of Capital } (K_o) = \frac{\text{Net Operating Earnings (or EBIT)}}{\text{Market Value of the Firm}}$$

The cost of capital of the total capital of a firm may be computed as weighted average cost of capital.

$$K_o = K_d \left(\frac{\text{Debt}}{\text{Debt + Share Capital}} \right) + K_e \left(\frac{\text{Share Capital}}{\text{Debt + Share Capital}} \right)$$

Now, we will learn what will happen to 'Ko' when a degree of change occurs and the ratio of Debt/Equity changes. A degree change in debt/equity proportion and its impact on value of the equity is called the financial leverage process. Before, making discussion in detail in leverage, it is desirable to study the relationship of risk and capital structure of a firm.

A firm's capital structure must be developed taking risk into account. There are two types of risk associated with capital structure, *viz.*, business risk, and financial risk. The capital structure must be consistent with the business risk, and financial risk. The prevailing business risk tends to act as an input into the capital structure decision process, the output of which is a certain level of financial risk. Because of the direct link between risk and value, the financial manager must understand the role of business and financial risk in capital structure decision process. The operating risk and financial risk have been discussed in detail in preceding part of this chapter. There are various theories on capital structure viz., net income approach, net operating income approach, traditional approach Modigliani and Miller approach. The scope of this book is limited therefore these theories are not discussed.

Review Questions

1. What do you understand from capital structure? Gives the assumption of capital structure in normal conditions in order to find out overall cost of capital.
2. What is meant by the term leverage? What types of risks are associated with leverage?
3. How can operating break-even analysis be used to evaluate the feasibility of operations and capital structure?
4. What do you understand from financial break-even point? How it is different from point of equivalency?
5. Differentiate operating leverage and financial leverage.
6. Compute operating leverage of a X Co. in following cases.

Particulars	**Year 2017 Amount in (₹)**	**Year 2018 Amount in (₹)**	**Year 2019 Amount in (₹)**
Sales (in units)	450	420	460
Sale Price per unit	500	500	500
Variable cost per unit	200	200	200
Fixed operating cost	135000	135000	135000

Show the results on a graph to magnify the results of DOL.

7. The comparative statement of two companies, namely Radha Co. Ltd and Mohan Co. Ltd. given below:

Particulars	**Radha Co.**	**Mohan Co.**
Sales	400000	400000
Variable Cost	200000	200000
Contribution	Calculate?	Calculate?
Fixed Cost	100000	0
EBIT	Calculate?	Calculate?
Interest	0	1000
EBT	Calculate?	Calculate?

You are required to calculate different leverages, and comment which company is better in financial terms, assuming the rate of taxes is 30% and number of shares is 6000.

8. Compute financial leverage of ABC Co. Ltd. from the following information. The company has debt securities of ₹100000 at 20% interest, in its capital structure. The number of equity shares are 20000. Assume tax rate is 40%.

Particulars	**Year 1**	**Year 2**	**Year 3**
EBIT	555000	715000	875000
Interest	20000	20000	20000

Particulars	Year 1	Year 2	Year 3
EBT	535000	695000	855000
Taxes	214000	278000	342000
Net Income	321000	41700	513000
EPS	Compute	Compute	Compute

9. Following data of three companies, Samridhi, Drishti, and Shourya Co. Ltd. are given below.

Particulars	Samridhi	Drishti	Shourya
Sale price (per unit)	180	210	300
Variable operating cost (per unit)	67.5	135	120
Fixed operating cost	450000	300000	900000

What is the break-even point in units for each firm?

(a) What would be OL of each company, if their sales in units are 15000, 12000, and 10000 respectively?

(b) Comment on ranking of these companies.

10. X Co. Ltd. has EBIT of ₹675000, interest cost ₹225000, and the firm has 15000 shares of equity capital. Assume tax rate is 40%. Compute the followings

(a) Degree of financial leverage

(b) Using a set of EBIT-EPS axes, plot the financial plan of the company.

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