Dr.Babasaheb Ambedkar Open University

DFM
DIPLOMA IN FINANCIAL MANAGEMENT

Block

3

Policy Matters in Financial Management

NOTES

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Unit :12: Cost of Capital

Introduction:

The cost of capital is one of the most important factor that will decide the capital structure of the firm. Before determining capital structure, the firm will consider the cost of capital of various sources of finance. Even a project can be selected only if the rate of return of the project is less than its cost of capital. From the view point of the investors it is a reward that a firm will get by making investment in the firm. But from companies point of view, the cost of capital refers to the financial burden that a company has to bear in financing its business.

Structure of the Chapter:

12.1 Objective:

At the end of this chapter the student will learn about –

- ❑ Meaning of cost of capital
- ❑ Need to determine cost of capital
- ❑ Calculation of cost of capital for various sources of finance
- ❑ Weighted average cost of capital
- ❑ Marginal cost of capital

12.2 Definition:

According to Solomon Ezra 'The cost of capital is the minimum required rate of earnings or the cut-off rate of capital expenditure'.

According to Hampton, 'Cost of capital is the rate of return which a firm requires from an investment in order to increase the value of the firm in the market place.'

Cost of capital for various sources of capital:

12.3 Cost of Equity (K_E)

Payment of dividend is not compulsory and so some people argue that equity capital does not carry any cost but such argument will be proved in following discussion. The funds required for the project are raised from the equity shareholders which are of permanent nature. These funds need not be repayable during the life time of the organisation. Hence it is permanent source of funds. The equity shareholders are the owners of the company. The main objective of the firm is to maximize the wealth of the equity shareholders. Equity share capital is the risk less capital of the company. If the company's business is doing well the ultimate beneficiaries are the equity shareholders who will get the return in the from the dividend from the company and the capital appreciation for their investment. If the company comes for liquidation due to losses, the ultimate and worst sufferers are the equity shareholders. Sometimes they may not get their investment back during the liquidation process.

Companies raise external equity capital by issuing new shares and internally by retained earnings. In both the cases, the investors are providing money to the companies to finance their investment projects. However, for the company, external equity would cost more than the internal equity because of the floatation costs. The investors expected rate of return would be similar whether they buy new shares or forego dividends as in the case of retained earnings, which should have been paid to them.

Profits after taxation, less dividend paid out to the preference shareholders, are funds that belong to the equity shareholders which may be reinvested in the company and therefore, those retained funds should also be included in the category of equity, the cost of retained earning is discussed separately from cost of equity capital. The cost of equity may be defined as the minimum rate of return that a company must earn on the equity financed portion of an investment project so that market price of the shares

remain unchanged. Calculation of the cost of equity capital is little difficult because in case of equity shareholders the rate of return is never fixed. The rate of dividend is suggested by the management and approved by the equity holders in their general meeting. The following methods are used in calculation of cost of Equity.

12.3.1 Dividend Yield Method:

As per this formula the cost of equity will be the discount rate that equates the present value of all expected future dividends per share with the net proceeds of the sale of a share. This method is based on the assumption that the market value of shares is directly related to the future dividend on the shares. Another assumption is that the future dividend per share is expected to be constant and the company is expected to earn at least this yield to keep the shareholders content.

$$Ke = \frac{D_1}{Po}$$

Where,

Ke = Cost of Equity
D_1 = Annual dividend per share
Po = Ex-dividend market price per share

This method emphasizes on future dividend expected to be constant, it does not allow for any growth rate. But in reality, a shareholder expects the returns from his equity investment to grow over time.

- Ram ltd. has disbursed a dividend of RS. 30 on each Equity share of Rs. 10. The current market price of share is Rs. 80. Calculate the cost of equity as per dividend yield method.

$$Ke = D1 / P0$$

Where,
$D1$ = Dividend per share of current period i.e Rs. 30
$P0$ = Market price per share i.e. Rs. 80
Ke = Rs. 30 / Rs. 80 = 0.375 or 37.55

12.3.2 Gordon's Dividend growth model:

The above method is based on the assumption that the future dividend will be constant forever and there will be no positive or negative growth in dividend which seems to be somewhat unrealistic. According to dividend growth model, growth in dividend is also considered for calculation of cost of equity. The formula under this method will be:

$$Ke = \frac{D_1}{Po} + g$$

Where g = growth in dividend

- The equity of India Ltd. is traded in the market at Rs. 90 each. The current year dividend per share is Rs.18. The subsequent growth in dividend is expected at the rate of 6%. Calculate the cost of equity capital.

$$Ke = D1/PO + g$$
$$= Rs. 18 / Rs. 90 + 0.06$$
$$= 0.20 = 0.06 = 0.26 \text{ or } 265.$$

- Cinema Ltd. has its equity shares of Rs. 10 each quoted in a stock exchange has market price of Rs. 56. A constant expected growth rate of 6% and a dividend of Rs. 3.60 per share has been paid for the previous year. Calculate the cost of capital.

Here, dividend of Rs.3.6 is given for the previous year so for finding dividend of current year, growth will be added in the amount of dividend of previous year and that D1 will be arrived.

$$Ke = Do (1+g) / Pe + g$$
$$= 3.60 (1 + 0.06) / 56 + 0.06$$
$$= 0.0681 + 0.06$$
$$= 0.1281 \text{ or } 12.81\%$$

12.3.3 Price Earning Method

This method takes into consideration the earning per share (EPS) and the market price of the share. It is base on the assumption that the investors capitalize the stream of future earnings of the share and the earnings of a share need not be in the form of dividend and also it need not be disbursed to the shareholders. It based on the argument that even if the earnings are not disbursed as dividends, it is kept in the retained earnings and it causes future growth in the earnings of the company as well as the increase in market price of the share. In calculation of cost of equity share capital, the earnings per share is dividend by the current market price.

$$K_e = \frac{E}{PO}$$

Where

E = Current earnings per share
PO = Market price per share

Note: When new equity shares are issued, some floatation costs like cost of prospectus, legal expenses, brokerage etc. will arise. Hence, the company receives a net proceed which is less than market price of equity share. In such case while considering the price of such new equity shares such floatation cost will be deducted.

- Googal Ltd. has 50,000 equity shares of Rs.10 each and its current market value is Rs. 45 each. The after tax profit of the company for the year ended 31st March, 2001 is Rs. 9, 60,000. Calculate the cost of capital based on price/earning method.

Calculation of EPS

$$= Rs. 9, 60,000/ 50,000 \text{ Equity shares} = RS. 19.20$$

Ke $= E/P0$

$. = Rs. 19.20/ Rs. 45$

$= 0.4267 \text{ or } 42.67\%.$

Thus, According to this approach, the cost of equity capital is the investors required rate of return, which equates the present value of the expected dividends discounted at the rate of return required by equity shareholders.

12.3.4 Capital Asset Pricing Model (CAPM)

The CAPM divides the cost of equity into two components, the near risk-free return available on investing in government bonds and an additional risk premium for investing in a particular share or investment. This risk premium in turn comprises the average return on the overall market portfolio and the beta factor (or risk) of the particular investment. Putting this all together the CAPM assesses the cost of equity for an investment as the following:

$$K_c = R_f + B_i [R_m - R_f]$$

Where R_f = Risk-free Rate of return

R_m = Average market return

B_i = Beta of the investment

Illustration:

Modern Ltd's share beta factor is 1.50. The risk free rate of interest on government securities is 10%. The expected rate of return on company equity shares is 17%. Calculate cost of equity capital base don capital asset pricing model.

$$K_c = 10\% + 1.50 (17\% - 10\%)$$

$$= 10.\% + 1.50 (7\%)$$

$$= 9\% + 10.5\%$$

$$= 19.5\%$$

According to this approach, there is a linear relationship between risk and expected return. When the investor expects higher rate of return, he should be prepared to bear greater risk.

12.4 Cost of Preference Shares:

Preference shareholders will get the dividend before any dividend is distributed to equity shareholders but it does not mean that it is compulsory to pay dividend to preference shareholders. Dividend on preference shares will be given only if the company has adequate profits for distribution of such dividend except only in the case of cumulative preference shares where if the dividend is not paid due to lack of profits then it will be carried forward to next years unless profit is generated and dividend is distributed to them. Dividend is not a charge against the profits but in fact it is an

appropriation of the profits. There are two types of preference share capital 1. redeemable and irredeemable, calculation of cost of capital for both the types is given below.

12.4.1 Cost of redeemable preference shares :

The cost of redeemable preference shares is calculated as follows:

$$Kp = \frac{D + \dfrac{Rv - Sv}{N}}{\dfrac{Rv + Sv}{2}}$$

Kp   = Cost of preference shares
D   = Constant annual dividend payment
N   = No. of years to redemption
Rv   = Redeemable value of preference shares at the time of redemption
Sv   = Sale out value of preference share less discount and flotation expense.

- Durga Ltd. has Rs. 100 preference share redeemable at a premium of 10% with 15 years maturity. The coupon rate is 12%. Flotation cost is 5%. Sale price is Rs. 95 because of discount of 5% at the time of isuue. Calculate the cost of preference shares.

$$Kp = \frac{D + (Rv - Sv/ N)}{(Rv + Sv/2)}$$

Where,

D = Coupon rate i.e. Rs. 12
N = Years to Redemption i.e. 15 years
Rv = Redeemable value with 10% premium i.e. Rs. 110
Sv = Sale value (Nominal value – Discount – Floatation cost)
    i.e. Rs. 100 – Rs. 5 – Rs. 5 = Rs. 90

$$Kf = \frac{12 + (110 - 90 / 15)}{(110 + 90 / 2)}$$

$$= 12 + 1.33 / 100$$
$$= 13.33 / 100$$
$$= 0.1333 \text{ or } 13.33\%.$$

12.4.2 Cost of Irredmable Preference Share:

$$Kp = D$$

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 P
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D= Dividend Per Share
P= Market Price Per Share

Note: in case of new issue of preference share any floation cost will go to reduce the price of preference share.
  - Marcos Ltd. has issued 10,000 irredeemable preference shares of Rs. 150 each at a coupon rate of 14% p.a. The issue expenses are Rs. 15 per share. Calculate the cost of preference share capital.

$$Kp = D/P$$

Where,
      D = Preference dividend per share i.e. Rs. 21
      P = Net proceeds received after flotation expenses i.e. Rs. 150 –
Rs. 15 = Rs. 135

      Kp = Rs. 21 / Rs. 135

= 0.1555 or 15.55%

12.5   Cost of Debt (K_D)

The capital structure of a firm normally include the debt component also, debt may be in the form of Debentures, Bonds, Term loans from financial institutions and Banks etc. The debts is carried a fixed rate of interest payable to them, irrespective of the profitability of the company. Since the coupon rate is fixed, the firm increases its earnings through debt financing. Then after payment of fixed interest charges, more surplus is available for equity shareholders, and hence EPS will increase. An important point to be remembered that dividends payable to equity shareholders and preference shareholders is an appropriation of profit, where as the interest payable on debt is a charge against profit. Therefore, any payment towards interest will reduce the profit and ultimately the company's tax liability would decrease. This phenomenon is called 'Tax Shield'. The tax shield is viewed as a benefit accrues to the company which is geared. For the purpose, the company must be able to show a taxable profit every year to take full advantage of the tax shield and if the company makes loss, the tax shield goes down and cost of borrowing increases.

12.5.1 Cost of Perpetual Debt:

The cost of perpetual debt (irredeemable debt) is calculated with the following formula:

$$K_d = \frac{I(1-t)}{}$$

D

Kd = Cost of debt
I = Annual interest payment
T = Company's effective corporate tax rate
D = Net proceeds of issue of Debentures, Bond, Term loan etc.

- Mantra Ltd. has issued 30,000 irredeemable 14% debenture of Rs. 150 each. The cost of flotation of debenture is 5% of the total issued amount. The company's taxation rate is 40%. Calculate the cost of debt.

Calculation of net proceeds from debenture issue

Total issue amount	(30,000 Deb.x Rs. 150)	45,00,000
Less : flotation cost	(Rs. 45,00,000 x 5 /100)	2,25,000
Net proceeds from issue		42,75,000

Annual interest charge

(Rs. 45, 00,000 x 14 / 100)   = Rs. 6, 30,000

K_d = I (I-T) / D

  = Rs 6, 30,000 (1 – 0.40) / Rs. 42, 75,000
  = 3, 78,000 / 42, 75,000
  = 0.0884 or 8.84%.

12.5.2 Cost of Redeemable Debt:

The cost of redeemable debt is calculated by applying the following formula:

$$K_d = \cfrac{1 + \cfrac{Rv - Sv}{N}(1-t)}{\cfrac{Rv + Sv}{2}}$$

Where
  K_D = Cost of debt
  I *= Annual interest payment*
  Rv = Redeemable value of debt at the time of maturity
  S_v = Sale value less discount and flotation expenses
  N *= Term of maturity period*
  T = Company's effective tax rate

- Saibaba Ltd. has raised fund through issue of 10,000 debentures of Rs. 150 each at a discount of Rs. 10 per debenture with 10 years maturity. The coupon rate is 16%. The flotation cost is Rs. 5 per debenture. The debentures are redeemable

with a 10% premium. The corporate taxation rate is 40%. Calculate the cost of debentures.

$$Kd = \frac{[I + (Rv - Sv / N)] (1 - T)}{(Rv + Sv) / 2}$$

$$= \frac{[24 + (165 - 135) / 10] (1 - 0.40)}{(165 - 135) / 2}$$

$$= (24 + 3) (0.60) / 150$$

$$= 16.2 / 150$$

$$= 0.108 \text{ or } 10.8\%$$

In term of equation, Cost of Debt = Coupon rate on the bonds *minus* The Tax Savings

12.6   Retained Earnings:

When the company raises funds by issuing debentures, it is required to pay interest at fixed rate, even on preference shares, it has to pay dividend at a fixed rate. But if they make the use of retained earnings, they are not supposed to pay any interest or dividend to any one. So can it be treated as cost free source of capital? No, it has some cost which is based on the assumption that had this earnings been distributed among the shareholders instead of retaining within the firm, they would have invested them somewhere else. Thus the cost of retained earnings is the return the shareholder had foregone by not investing his share of earnings elsewhere.

In we understand it as a practical illustration,
After a company makes money (earnings), who owns that money? The shareholders, right? But when you retain earnings are not given back to the shareholders. Company is keeping it. In a way, company is investing it for them in other activities. Well those shareholders want some return on that money company is keeping.. How much return do they expect? They want the same amount as if they had gotten the retained earning in the form of dividends, and bought more stock in your company with them. THAT is the cost of retained earnings.

12.7   Weighted Average Cost of Capital (WACC)

In simple terms, the WACC is the overall cost of capital for the firm considering all capital components with their respective weights in the capital mix. The argument in favour of using WACC seems from the concept that investment capital form various source should be seen as a poll of available capital for all the capital projects of an organization. Hence cost of capital should be weighted average cost of capital. Traditionally, optimal capital structures is assumed at a point where WACC is minimum. For project evaluation, this WACC is considered as the minimum rate of return required from project to pay off the expected return of the investors and as such

WACC generally referred to as the required are of return. Accordingly, the relative worth of a project is determined using this required rate of return as the discounting rate. Thus, WACC gets much importance in both in decisions.

Calculation of WACC

The combined cost of equity capital and debt capital is the WACC for a company as whole. For finding WACC, first of all specific cost of each source of finance in capital mix will be found, secondly, such specific cost will be multiplied with their relative weight in overall capital structure and in last weighted costs so found for all sources are added together which will ultimately ascertained WACC.

WACC is calculated by multiplying the cost of each capital component by its proportional weighting and then summing:

$$WACC = \frac{E}{V} \times Re + \frac{D}{V} \times Rd \times (1 - Tc)$$

Where:
Re = cost of equity
Rd = cost of debt
E = the market value of the firm's equity
D = the market value of the firm's debt
V = E + D
E/V = percentage of financing that is equity
D/V = percentage of financing that is debt
Tc = the corporate tax rate

But if the company is all equity financed, the cost of equity will be the cost of capital.

The weighed average cost of capital of a company in calculated in two ways.

◆ Based on weight of costs by the book value of the different forms of capital.
◆ Based on weight of market value of each form of capital.

The market value approach is more realistic for the reasons given below:

◆ The cost of funds invested at market prices is familiar with the investors.
◆ Investments are generally rated by the reference to their earnings yield, and company has a responsibility to maintain that yield.
◆ Historic book values have no relevance in calculation of real cost of cap al.
◆ The market value represents near to the opportunity cost of capital.

• Amrita Ltd. has the following capital structure:

Particulars	Market Value	Book Value	Cost %
Equity share Capital	80	120	18
Preference Share Capital	30	20	15
Fully Secured Debenture	40	40	14

Calculate the company's weighted average cost of capital. Cost of individual sources of capital is net of tax.

WACC based on market value

Capital structure	Market value (Rs. Lakhs) (a)	% (b)	Cost (net of Tax) ©	Weighted cost of capital (b) x (c) = (d)
Equity share capital	80	53.33	18	9.60
Preference Capital	30	20.00	15	3.60
Debentures	40	26.67	14	3.73
Total	150	100		16.33

The weighted average cost of capital of the company based on market value is 16.33%

WACC based on book value

Capital structure	Market value (Rs. Lakhs) (a)	% (b)	Cost (net of Tax) ©	Weighted cost of capital (b) x (c) = (d)
Equity share capital	120	66.67	18	12.00
Preference Capital	20	11.11	15	1.67
Debentures	40	22.22	14	3.11
Total	180	100		16.78

The weighted average cost of capital of the company based on book value is 16.78%.

12.8 Marginal cost of Capital

The marginal cost of capital is the cost of obtaining an extra Re.1 of finance. The marginal cost of capital reflects the changes in the total cost of capital structure before and after the introduction of new capital. It is the simple difference between the total cost with existing capital structure and the total cost with the structure that will exist once the investment has been undertaken. The theory of capital budgeting leads to the conclusion that projects should be accepted if they have a positive net present value calculated after discounting the revenue and cost streams at the marginal cost of capital to the firm. Using the alternative internal rate of return criteria, all projects would be accepted that have an internal rate of return grater than the marginal cost of capital. Emphasis is being placed on the marginal cost of capital, for it is only earnings above these cost that add to the total profits of the firm.

The economic theory of a firm operates via the principle that the firm should operate at a level where marginal revenue is equal to marginal costs. When this is applied to capital investment decisions, shareholder's wealth is maximized.

Illustrates that he firm should invest in Project A, B, C and D because their returns exceed the firm's cost of capital. Project E and F will be rejected. The cost of capital is a market determined rate of interest and is the discount rate or required rates of return which is used for discounting cash flows in investment appraisal calculations.

12.9 Practicals:

1. Alkesh Ltd. has issued 10% perpetual debentures of Rs. 100 each to raise Rs. 5 lakes. The tax rate is 50 %. Calculate the cost of debentures under following circumstances: If they are issued (I) at par (ii) at a premium of 8% (iii) at a discount of 8 5 %.

Solution:

We shall use the above formula for these three situations

$$K_d = \frac{I}{P}(I-t),$$

Where,

I = Rs. 10
P = Net amount received
T = Rate of tax 0.50

(i)   if debentures are issued at par :

P : Rs. 500000 Total Proceeds;
I : Total Interest = Rs. 50,000

$$\text{Cost of debt} = \frac{\text{Rs. 50,000}}{\text{Rs. 5,00,000}}(1-.50)$$

$$= .10 \times 0.5 = .5 = 5.0 \%$$

(ii)   If debentures are issued at a premium of 8 % : .

P = 5,00,000 + premium 8 %   = Rs. 40000 premium + 5,00,000
                              = Rs. 540,000.

$$\text{Cost of debt} = \frac{50,000}{5,40,000}(1 - .50)$$

$$= \frac{5}{54}(.50)$$

$$= .093 \times .50$$

$$= .465 = 4.65\%.$$

(iii)   If debentures are issued at a discount of 8 % :

P = 5,00,000 – 8 % discount Rs. 40,000 = Rs. 4,60,000

$$\text{Cost of debt} = \frac{50,000}{4,60,000} (1 - .50)$$

$$= \frac{5}{46} (.40) \quad = .109\% \times .50$$

$$= .0545 \quad\quad\quad = 5.45\%$$

2. Sharp Ltd. issued 10,000 14% Irredeemable debentures of Rs. 100. The company paid following floatation charges: Underwriting commission 1.5 % brokerage 0.5 % and other charges Rs. 10,000. If the tax rate is 50%. Calculate the cost of debentures under the following circumstances:

(i)   If they are issued at par
(ii)   If they are issued at a discount of 5%
(iii)   If they are issued at a premium of 15 %

Solution:

(i)   If they are issued at par :

$$K_d = \frac{I}{P} (I - t)$$ Where, $I = $ Rs. 1,40,000

$P = 10,000$ (Rs. 100 – Expenses)

$$K_d = \frac{1,40,000}{9,70,000} (1 - 0.5) \quad\quad = 10,000 (100 - 3)$$

$$= .1443 (0.5) \quad\quad\quad\quad = 9,70000$$

$$= 0.1443 \times 0.5 \quad\quad\quad\quad t = \text{Rate of tax } 50\%$$

$$= 0.0772 = 7.72\%$$

(ii)   If they are issued at a discount of 5 % :

Here P = Rs.100 – Discount Rs.5 – Expenses Rs.3
$\quad\quad = $ Rs.92 x 10000
$\quad\quad = $ Rs.920000

$$I$$

$$\therefore K_d = \frac{I}{P} (1-t)$$

$$= \frac{140000}{920000} (1-0.5)$$

$$= .1521 \times 0.5$$
$$= 7.60\%$$

(iii) If they are issued at a premium of 15 %:

Here P = Rs.100 + Rs.15 premium − Expenses Rs.3
= Rs.112 x 10000 = Rs.1120000

$$K_d = \frac{I}{P} (1-t)$$

$$= \frac{140000}{1120000} (1-0.5)$$

$$= 0.125 \times 0.5$$

$$= 6.25 \%$$

3. XYZ Ltd.issued eight year 10 % debentures at a price or Rs.92 to raise Rs.500000. The value of the debentures is Rs.100. The tax rate is 50 percent. Calculate the post tax cost of this issue.

Solution:

Here, the sum is solved with different formula than what is used during examples but students should note that here only the old formula is presented with new look otherwise there is no difference in formula.

Here, sum is presented in two ways with two different formulas.

Here, in this sum we assume that,

F=Price of redemption of debentures
P=Price of issue of debntures
R=Rate of interest
N=No. of years

$$X = \frac{1}{N} (F-P) \qquad \frac{1}{8} (100-92)$$

$$= \frac{1}{8} \times 8$$

$$= Rs.1$$

Before tax cost of debt (K) $= \dfrac{(R + X)}{\frac{1}{2}(F + P)}$

$$= \frac{(10 + 1)}{\frac{1}{2}(100 + 92)}$$

$$= \frac{11}{192 / 2} \quad = \frac{11}{96}$$

$$= .1145 \text{ or } 11.45\%$$

After tax cost of debt (K$_d$) $= K(1 - t)$
$= 11.45(1 - 0.5)$
$= 5.72\%$

In we do not want to calculate before tax and after tax cost of capital separately, we can use the following formula:

After tax cost of capital (Kd) $= \dfrac{(1 - t)(R + X)}{\frac{1}{2}(F + P)}$

$$= \frac{(1 - 0.5)(10 + 1)}{\frac{1}{2}(100 + 92)}$$

$$= \frac{0.50 \times 11}{96}$$

$$= \frac{5.50}{96} \quad = 5.72\%$$

4. Asia Ltd. issued 10 % debentures of Rs.100 each at per. The debentures are to be repaid after 10 years. These debentures are floated at their face value, but the cost of floatation comes to # per cent. The tax rate is 50 %. Calculate the cost of debt.

Solution:

First, let us calculate the values to be used in the formula.

R = Interest per debenture = Rs.10, F = Face value ➝Rs.100

P = Net proceeds = Rs.96 (Rs.100 – Rs.4, floatation cost)

$$X = \frac{1}{N}(F - P) = \frac{1}{10}(100 - 96) = \frac{4}{10} = 0.4$$

Now before tax cost of debt $= \frac{(R + X)}{\frac{1}{2}(F + P)} = \frac{(10 + 0.4)}{\frac{1}{2}(100 + 96)}$

$$K_1 = \frac{10.4}{98} = 0.1061 \text{ or } 10.61\%$$

After tax cost of debt (= K_d) = $K_i (1 - t)$
= 10.61 (1 – 0.50)
= 10.61 x 0.50
= 5.30 %

5. Vision world Ltd. issues 11 % redeemable preference shares of Rs.100 each, to be redeemed after 10 years. The floatation cost is estimated at 4 % of the expected sale proceeds. Compute the cost of preference capital, if the rate of taxation is 50 %.

Solution:
Here, the sum is solved with different formula than what is used during examples but students should note that here only the old formula is presented with new look otherwise there is no difference in formula.

Cost of Pref. Capital K_p $= \dfrac{R + X}{\frac{1}{2}(F + P)}$

Where:
R = Rs.10
P = Rs.96
F = Rs.100
n = 10 yeras

$$X = \frac{1}{n}(F - P) = \frac{1}{10}(100 - 96) = \frac{4}{10} = 0.4$$

$$\therefore Kp = \frac{11 + 0.4}{\frac{1}{2}(100 + 96)} = \frac{11.4}{98} = 11.63\%$$

6. Richards Ltd. issued 10000 12 % Redeemable preference shares of Rs.100 each at a discount of 5%. The cost of shares issue amount to Rs.3000. these shares are to be redeemed at par after 10 years. Find out the cost of capital of preference shares.
    What would be the cost of capital, if the preference shares are irredeemable?

Solution:

(a) **When preference shards are redeemable:**

$$K_p = \frac{R + \dfrac{1}{n}(F - P)}{\frac{1}{2}(F + P)}$$

Cost of Pref. Shares

Where
R = Dividend Rs.12
N = No of years (10)
P = Face value of shares (Rs.100)
F = Realized (Rs.100 – 5 – 3)

$$= \frac{12 + \dfrac{1}{10}(100 - 93)}{\frac{1}{2}(100 + 92)}$$

$$= \frac{12 + \dfrac{1}{10}(8)}{\frac{1}{2}(192)}$$

$$= \frac{12 + 0.8}{96}$$

$$= .1333 \text{ or } 13.33\%$$

(b) **If preference shares are irredeemable:**

Cost of preference share Cap. Kp $= \dfrac{D}{P} = \dfrac{12}{92} = 0.1304$ or 13.04%

7. The proportion of various sources of finance in the capital structure of Thomas Ltd. is as follows:

	(Rs. in lakhs)	Percent
Debentures	60	30
Preference Shares capital	40	20
Equity Shares capital	50	25
Retain Earnings	50	25
	200 laksh	100 %

The specific costs of raising finance from various sources are given below:

Debentures	8%
Preference Shares capital	8%
Equity Shares capital	10%
Retain Earnings	10%

Calculate weighted average cost of capital.

Solution:

The proportion of various sources of finance in the capital structure is given and we shall give weightage of this proportion to ascertain average cost of capital.

Source	Proportion	Specific Cost	Weighted
Debentures	30%	8.00%	2.40%
Preference Share Capital	20%	8.00%	1.60%
Equity Share Capital	25%	10.00%	2.50%
Retain Earning	25%	10.00%	2.50%
			9.00%

The above calculations show that the composite or combined cost of capital or the weighted average cost of capital is 9.0 %.

12.10 Exercise

Answer the following questions

1. Explain dividend yield method of calculating cost of capital?

2. Explain dividend growth method of calculating cost of capital?

3. Explain capital asset price method of calculating cost of capital?

4. Write the formulas to be used for calculating cost of capital for redeemable and irremeably preference shares?

5. Explain the concept of weighted average cost of capital?

6. Explain the concept of marginal cost of capital?

12.11 Practical Exercise

1. Marcos Ltd. has on its books the following amount of capital and specific costs of each type of capital:

Type of Capital	Book Value Rs.	Market Value Rs.	Specific Cost
Debentures	250000	180000	9%
Preference Share Capital	80000	70000	11%
Equity Share Capital	400000		16%
Retained Earning	100000	540000	10%
	830000		

      Determine the weighted average cost of capital using (a) Book value weights and (b) Market value weights.

2. The following details are extracted from Tendulkar Ltd.

	Rs.
Equity Share capital	300000
Reserves and Surplus	130000
10% Debentures	170000

The rate of tax is 50 %. Dividend on equity share is 12%.
Calculate weighted average cost of capital.

3. Good Luck Ltd. has the following specific cost of capital along with the indicated book and market value weights. Tax rate is assumed to be 50%.

Type of Capital	Cost	Book Value Weights	Market Value Weights
Long term debt	5%	30%	25%
Preference shares	10%	20%	17%
Equity shares	12%	40%	46%
Retained Earnings	8%	10%	12%
		100%	100%

(i)   Calculate the weighted cost of capital using book value and market value weights, which of them do you consider better and why?

(ii)   Calculate the weighted average cost of capital using marginal weights if the company intends to raise the needed funds using 40% long-term debt, 30% preference shares and 40% retained earnings.

4.

(a) A firm's after-tax cost of capital of the specific sources is as follows:

Cost of debt   8 per cent

Cost of preference shares   14

Cost of equity funds   17

(b) The following is the capital structure:

Source	Amount
Debt.	Rs 3,20,000
Preference capital	2,00,000
Equity capital	5,00,000
	10,00,000

(c) Calculate the weighted average cost of capital, Ko, using book value weights.

5. Calculate the explicit cost of debt for each of the following situations:

(a) Debentures are sold at par and flotation costs are 6 per cent.

(b) Debentures are sold at premium of 10 per cent and flotation costs are 5 per cent of issue price.

(c) Debentures are sold at discount of 6 per cent and flotation costs are 5 per cent of issue price.

Assume: (i) coupon rate of interest on debenture is 15 per cent; (ii) face value of debentures is Rs 100; (iii) maturity period is 10-years; and (iv) tax rate is 35 per cent.

6. A company has on its books the following amounts and specific costs of each type of capital. ·

Type of capital	Book value	Market value	Specific costs (%)
Debt	Rs 4,00,000	Rs 3,80,000	5
Preference	1,00,000	1,10,000	8
Equity	6,50,000		15
Retained earnings	2,00,000	12,00,000	13
	13,00,000	16,90,000	

Determine the weighted average cost of capital using (a) Book value weights and, (b) Market value weights. How are they different? Can you think of a situation where the weighted average cost of capital would be the same using either of the weights?

7. Assuming a corporate tax rate of 35 per cent, compute the after-tax cost of the capital in the following situations:

(a) A perpetual 16 per cent debentures of Rs 1,000, sold at the premium of 10 per cent with no flotation costs.

(b) A ten year 14 per cent debenture of Rs 2,000 redeemable at par, with 5 per cent flotation cost

(c) A ten year 15 per cent preference share of Rs 100, redeemable at premium of 5 per cent, flotation costs.

(d) An equity share selling at Rs 50 and paying a dividend of Rs 6 per share, which is expected to be continued indefinitely

(e) The same equity share (that is, described in situation (d), if dividends are expected to grow at the rate of 5 per cent.

(f) An equity share, selling at Rs 120 per share, of a company that engages only in equity financing. The earning per share is Rs 20 of which 50 per cent is paid in dividends. The shareholders expect the company to earn a constant after-tax rate of 10 per cent on its investment of retained earnings.

8. From the following information supplied to you, determine the appropriate weighted average cost of capital, relevant for evaluating long-term investment projects of the company:

Cost of equity   13 per cent

After-tax cost of long-term debt   7

After-tax cost of short-term loans   4

Source of capital .	Book value	Market value
Equity	Rs 5,00,000	Rs 7,50,000
Long-term debt	4,00,000	3,75,000
Short-term debt	1,00,000	1,00,000
	10,00,000	12,25,000

9. An electricity equipment manufacturing company wishes to determine the weighted average cost of capital for evaluating capital budgeting projects. You have been supplied with the following information to calculate the value of k_o for the company:
Balance sheet as on March 31

Liabilities	Assets	Sundry assets
Current liabilities	Rs 9,00,000	Rs 39,00,000
Debentures	9,00,000	
Preference shares	4,51,000	
Equity shares	12,00,000	
Retained earnings	4,50,000	
	39,00,000	39,00,000

Anticipated external financing information:
20 year, 8 per cent debenture of Rs 2,500 face value, redeemable at 5 per cent premium, sold at par, 2 per cent flotation costs.

10 per cent preference shares: sale price Rs 100 per share. 2 per cent flotation costs.

Equity shares: sale price Rs 115 per share; flotation costs would be Rs 5 per share.

The corporate tax rate is 35 per cent and expected equity dividend growth is 5 per cent per year. The expected dividend at the end of the current financial year is Rs 11 per share. Assume that the company is satisfied with its present capital structure and intends to maintain it.

10. A paper company has the following specific cost of capital along with the indicated book and market value weights.

Type of capital	Cost (%)	Book value weights (%)	Market value weights (%)
Long-term debt	5	30	25
Preference shares	11	20	17
Equity" shares	12	40	46
Retained earnings	12	10	12
		100	100

(a) Calculate the weighted average cost of capital using book value and market value weights. Which of them do you consider better and why?

(b) Calculate the weighted average cost of capital using material weights if the company intends to raise the needed funds using 50 per cent long-term debt, 35 per cent preference shares and 15 per cent retained earnings.

11. (a) The following information is available from the balance sheet of a company:
Equity share capital

(20,000 shares of Rs 10 each)	Rs 2,00,000
Reserve and surplus	1,30,000
9% Debentures	1,70,000

The rate of tax for the company is 35 per cent. Current level of equity dividned is 12 per cent. Determine the weighted avarge cost of capital

(b) The following information has been extracted from the balance sheet of Fashions Ltd as on March 31.

	Rs lakhs
Equity	400
12% Debentures	450
Term loan (interest 0.08)	1,200
	2,000

(i) Determine the weighted average cost of capital of the company. It had been paying dividends at a consistent rate of 20 per cent per annum.

(ii) What difference will it make if the current market price of the Rs 100 share is Rs 160?

(iii) Determine the effect of income tax on the cost of capital under both premises.

12. Kapoor Limited issues 16 per cent debentures, face value Rs 100 The net amount realised per debenture is Rs 97 The debentures are redeemable at par after 10 years The tax rate for the firm is 50 per cent What is the cost of these debentures?

13. Vijay Electronics Limited issues 16 per cent debentures, face value Rs 500 The cost of issue works out to 3 per cent The debentures are repayable after 7 years The firm has a tax rate of 60 per cent If the difference between the par value and the net amount realised can be amortised evenly over the life of the debentures, what is the cost of debentures to the firm?

14. Vaneeta Enterprises issues Rs 100 face value preference stock -which carries 13 per cent dividend and is redeemable after 12 years at par The net amount realised per preference share is Rs 95 What is the cost of preference capital'

15. The Superior Cement Company issues Rs 100 face value preference stock which carries 13 per cent dividend The preference capital is repayable in two equal instalments at the end of the tenth year and eleventh year, respectively The net amount realised per preference share is Rs 95 What is the cost of preference capital?

16. Mysore Manufacturing Company issues Rs 100 face value debentures carrying interest of 15 per tent The debentures are repayable in three annual instalments of Rs 30. Rs 30. and Rs 45 at the end of the seventh, eighth, and ninth year, respectively The interest, of course, is payable only on the outstanding amount The issue cost is 3 per cent The tax rate of the company is 60 per cent What is the cost of debenture capital to the company?

17. Bombay Electricals Corporation issues Rs 100 face value debentures carrying interest of 15 per cent The debenture are repayable after 7 years at a premium of 7 per cent The cost of issue is 3 per cent The tax rate of the company is 50 per cent The issue cost can be amortised evenly over the life of the debentures What is the cost of debenture capital?

18. The market price per share of Hazaribagh Company is Rs. 18.00. The dividend expected a year hence is Re. 1.00. The expected rate of dividend growth is 8 per cent. What is the cost of equity capital to the company?

19. The market price per share of a company presently is Rs. 160. The dividend expected a year hence is Rs. 12 per share. The dividend per share is expected to grow at a rate of 10 per cent per year for 5 years. Thereafter, the growth rate of dividend per share will decline to 6 per cent, a level which will be maintained forever. What is the cost of equity to the company?

Unit :13:
Operating and Financial Leverages

Introduction:

In determining the capital structure of a company, there are mainly two alternatives are available, owned capital and debt capital. The capital structure of the company will be decided by keeping in mind the main objective of the firm, maximization of the wealth of the equity shareholder who ultimately bear the risk in the business. There are certain benefits and certain losses associated with each source of finance, debt or equity and so it is not advisable to finance entire requirement of capital either by equity or by debt. It will be a combination of both type of type of capital in such a way that the return to the equity holders is maximized. If the rate of return on investment in business is higher than the rate of interest on debentures issued by the company, the earning per share goes up and therefore the company can distribute dividends at a higher rate. In this way, to use fixed interest bearing securities along with equity capital is called 'leverage'. If the company is not required to pay a fixed cost or return, there will be no leverage. Leverage is the result of use of funds carrying fixed cost or fixed return for the purpose of raising the return available to equity shareholders.

Structure of the Chapter

13.1   Objective:

At the end of this chapter the student will learn about –

❑ Meaning and importance of leverage
❑ Different type of leverages
❑ Calculation of different type of leverages

13.2   Meaning of 'Leverage'

The term 'leverage' refers to the ability of a firm in employing long-term funds having a fixed cost, to enhance returns to the owners. In other words 'leverage' is the employment of fixed assets or funds for which a firm has to meet fixed costs of fixed rate of interest obligation irrespective of the level of activities attained or the level of operating profit earned.

13.3   Leverage Ratios

Leverage ratios can be broadly classified into two groups.

1. Activity Leverage
2. Structural Leverage.

There are two ratios under the head of Activity Leverage which merit mention.

13.3.1 Operating Leverage -

The cost structure of any firm gives rise to operating leverage because of the existence of fixed nature of costs. This leverage relates to the sales and profit variations. Due to the fixed cost, which remain constant in the short run, profits increase more rapidly than the volume of sales. This situation is known as operating leverage. Sometimes a small fluctuation in sales, would have a great impact on profitability. This is because of the existence of fixed cost elements in the cost structure of a product. If there are no fixed cost in the firm then there will be no operating leverage in it.

Formula for finding Operating Leverage

$$\frac{\text{Profit before fixed cost}}{\text{Profit after fixed cost}}$$

Or

$$\text{Operating leverage} = \frac{\text{\%change in EBIT}}{\text{\% change in sales}}$$

Disadvantages

- The published accounts does not give details of the fixed cost incurred and the contribution from each product and for an outsider it is difficult to calculate the firm's operating leverage.
- The reliability of operating ration rests to a large extent on the correctness of the fixed costs identified with a product. Faulty apportionment would distort the usefulness of the ratio.

13.3.2 Financial Leverage –

When a company includes in its capital structure debentures and preference shares in addition to equity shares, financial leverage is said to be used. It refers to the use of debt or preference share capital, which uses lies fixed cost burden on firm, in the capital structure. Financial leverage ratio indicates the effects on earnings by rise of fixed cost funds. The object of financial leverage is to increase the returns on equity shares by earning a profit greater than the total amount of fixed charges on the debentures and preference shares. The ratio is calculated with the following formula:

$$\frac{\text{Earnings before interest and tax}}{\text{Earnings after interest}}$$

Or

$$\text{Financial Leverage} = \frac{\text{\% change in EPS}}{\text{\% changes in EBIT}}$$

- The higher the ratio, the higher the cushion for paying interest on borrowings. A low ratio indicates a low interest outflow and consequently lower borrowings. A high ratio is risky and constitutes a strain on profits. This ratio is considered along with the operating ratio, gives a fairly and accurate idea about the firm's earnings, its fixed costs and the interest expenses on long term borrowings.

- **Earnings per Share:** The more debt the firm employs the higher its financial leverage. Financial leverage affects expected EPS.

A firm is said to be highly levered if the proportion of long term debt and preferential share capital is high in relation to the Equity Share Capital. In such case the interest payment and preference dividends' could drastically reduce the pool available to the ordinary shareholders and their earnings per share falls.

Favourable or positive financial leverage occurs when the firm earns more on the assets purchased with the funds than the fixed financing cost paid. Excess of earnings over fixed costs goes to common shareholders. On the contrary, if the firm does not earn sufficient to cover financing costs, unfavourable or negative leverage is said to occur. The Finance Manager has to decide what amount of debt to use as a source of financing instead of financing with stock. In case of debt financing, the definite payment of interest is made.

13.3.3 Total Leverage – The policy regarding capital structure should be framed keeping in view the combined effect of operating leverage and financial leverage. Total leverage may be defined as the potential use of fixed costs, both operating and financial, which magnifies the effect of sales volume change on the EPS of the firm. The methods of production employed which are reflected in the asset structure of the firm, influence its operating leverage. For example, substituting machinery for labour usually increases operating leverage. The capital sources employed, which are reflected in the capital structure of the firm, influences its financial leverage. For example, substituting debt for common stockholders equity increases financial leverage. If the degree of both leverages is high, business will become more risky. Even too low degree of both leverages is also undesirable. Because a low degree of these leverages suggests that the amount of fixed costs is too small and the proportion of debts in total capital of the company is also extremely low. As a result the management will be deprived of a large number of a large number of profitable opportunities of investment.

Formulas for finding total leverage or combine leverages are as follows:

Total Leverage = Profit before fixed cost

$$\text{------------------------}$$

Profit after interest

Or,

% change in EPS

$$\text{------------------}$$

% change in sales

Structural Leverages

These ratios are related with the structure of capital mix. These ratios express the relationship between owner's capital and outsider's stake in the firm.

13.3.4 Debt-Equity Ratio –

This ratio is the most significant of leverage ratios as it gives the composition of the long term funds of the firm in terms of the stake of the owners and outsiders in the business. Debt means long term debt while equity is capital and free reserves. A high ratio indicated large outside borrowings and consequently a larger outside stake in the business.

Usually in calculating the ratio, the preference share capital is excluded from debt, but if the ratio is to show effect of use of fixed interest sources on earnings available to the shareholders then it is to be included. On the other hand, if the ratio is to examine financial solvency, then preference shares shall not form part of the capital.

13.3.5 Total Debt Equity Ratio:

A variation of the debt equity ratio is the total debt to equity ratio. Here total debt includes not only long-term debt but also current liabilities. The sundry creditors, have a claim on the assets of the firm and can keep pressure on the management. These reason favour the inclusion of current liabilities in debt-equity ratio to make it more realistic and for a strict evaluation of the debt-equity composition.

13.3.6 Debt to Net Worth Ratio:

The ratio compares the long-term debt to the net worth of the firm i.e. the capital and free reserves less intangible assets. This ratio is finer than the debt-equity ratio and excludes capital which is invested in fictitious assets like deferred expenditure and carried forward losses. This ratio would be great interest to the contributories of long-term finance to the firm, as the ratio gives a 'factual' idea of the assets available to meet the long-term liabilities.

13.3.7 Trading on Equity

The financial leverage explains the impact of EPS whereas 'trading on Equity' shows the impact of return on equity capital. As the debt funds are less risk bearing and have prior claims on income and assets of a firm over the equity shareholders, their rates of return should be less than that of total assets. Moreover, interest on debt is tax deductible so creates tax benefits. So if the company's rate of return is more than the cost of capital then it can be said that the company is trading on equity.

Trading on equity is calculated by deducting the rate of return of equity capital under the existing capital structure inclusive of debt capital from the rate of return on equity capital under all equity capital structure assuming that there is only equity capital in the capital structure.

13.3.8 Gearing and the Cost of Capital

Though we know that the debt capital is comparatively cheaper then equity capital and so the overall weithted average cost of capital will decrease due to inclusion of debt in the capital structure.. But this theory is applicable to certain level of debt in capital structure, after exceeding that level the debt would start become costlier due to the fact that it raises the risk and ultimately the expected return of equity holders and thus it will raise the overall weighted average cost of capital.

This is explained in the following illustration:

% of Debt in total financing	WACC %
0	25
10	20
30	15
50	15
70	24
90	30

So long as the existing gearing of the company is within the optimum range say 30% to 60%, the proportion of debt in a company's capital structure has little effect on a company's cost of capital. A company can operate within this range to maintain the unaffected costs of capital.

13.3.9 Gearing and EPS

In capital structure decision, the impact of gearing ratio is viewed on earnings per share. The amount of gearing has considerable effect on the earnings attributable to the equity shareholders. Normally, highly geared company reduces the profits available to equity holders due high interest burden. A highly geared firm must earn enough profits to cover the interest on debt before any profits available for distribution to the equity holders.

13.4 Financial Break-even and Indifference Analysis

Break even means the minimum level of EBIT needed to satisfy all fixed financial charges i.e., interest and preference dividends. It denotes the level of EBIT for which the firm's EPS just equal zero. If EBIT is less than financial break-even point, then EPS will be negative. But if the expected level of EBIT exceeds than that of break-even point, more fixed costs financing instruments can be inducted in the capital structure. Otherwise the use of equity would be preferred. EBIT – ESP break-even analysis is one of several methods used for determining the appropriate amount of debt a firm might carry.

Indifference point for two firms means such level of EBIT for both the firms at which the EPS for both the firms will be equal. When two alternative financial plans do produce the level of EBIT where EPS is the same, this situation is referred to as indifferent point level. In case. the expected level of EBIT exceeds the indifference point, the use of debt financing would be advantageous as it would maximize the EPS.

The indifference point may be defined as the level of EBIT beyond which the benefits of financial leverage begins to operate with respect to earnings per share. :

The formula use to determine the indifference point may be given as follows:

$$\frac{X(I-t)}{N_1} = \frac{(X-1)(1-t)}{N_2}$$

Where X = EBIT at indifference point
N_1 = No. of equity shares if only equity shares are issued
N_2 = No of equity shares issued when debentures are also issued
I = Interest
T = tax rate

Suppose a company wants to collect Rs.1000000 for its capital project, it can do so

(i)   either by issuing only equity shares or
(ii) by issuing equity shares of Rs.500000 and 10% debentures or Rs.500000.

Assume tax rate to be 40 %. The face value of shares is Rs.100.

Solution:

Indifference Point =

$$\frac{X(1-t)}{N_1} = \frac{(X-1)(1-t)}{N_2}$$

$$\therefore \frac{X(1-0.4)}{10000} = \frac{(X-50000)(1-0.4)}{50000}$$

$$\therefore \frac{0.6X}{10000} = \frac{0.6X - Rs.30000}{5000}$$

$\therefore 0.6\,X = 1.2X - Rs.60000$ (multiplying both sides by 10000)
$\therefore 1.2\,X - 0.6\,X = Rs.60000$
$\therefore 0.6\,X = Rs.60000$

$$\therefore X = \frac{60000}{0.6} = Rs.100000$$

$\therefore$ Indifference Point = At EBIT of Rs.10000.

Let us see whether this is correct.

	Only Equity	Equity + Deb.
EBIT	100000	100000
Less: Interest	--	50000
EBT	100000	50000
Less: Taxes	40000	20000
Earnings to equity shareholders	60000	30000
No. of equity shares	10000	5000
EPS	Rs.6	Rs.6

At this point both financial alternatives have the same EPS.

13.5   Practicals:

1.Calculate the Operating Leverage of Vinee Ltd. from the following data:

Selling Price	= Rs.11 per unit
Variable cost	= Rs.5 per unit
Fixed Operating Cost	= Rs.17000
Sales (Units)	= 12000

Moreover if the sale is increased is by 20% what change it will take in DOL.
Solution:

First Method:

$$\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

Total Contribution = Sales – Variable cost
= 12000 x 11 – 12000 x 5
= Rs.72000

EBIT = Total Contribution – Fixed cost
= 72000 – 17000
= Rs.55000

$$\text{Hence, DOL} = \frac{72000}{55000} = 1.3$$

(DOL = Degree of Operating Leverage)

Assume change in Sales by 20%

	Original (Rs.)	After 20 % increase In sales (Rs.)
Sales	132000	158400
Less: Variable Cost	60000	72000
Contribution	72000	86400
Less: Fixed Cost	17000	17000

EBIT		55000		69400

Percentage change in EBIT = 69400-55000/55000*100=26%

Percentage change in sales = 20% (assumed earlier)

$$DOL = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}} = \frac{26}{20} = 1.3$$

One can see that results obtained under both methods are the same.

Note: Even if we assume the change in sales by 30% or any other percent, the value of DOL calculated will be the same.

2.You are required to calculate the Financial Leverage in each of the three cases and interpret it.

	P	Q	R
Equity Capital (Shares of Rs.10 each)	4500	2200	5500
Debt	4000	5500	2200
Earning before Interest and Taxes	600	700	800

Interest can be assumed at the rate of 10% per annum in all the three cases. Ignore taxes.

		P	Q	R
EBIT	(a)	600	700	800
Less: Interest		400	550	220
Earning Before Taxes	(b)	200	150	580
No. of Equity Shares		450	220	550
EPS		0.44	0.68	1.05
Financial Leverage = (a/b)		600	700	800
(EBIT / EBT)		200	150	580
=		3	4.66	1.37

Financial Leverage can also be taken as the ratio of percentage change in EPS and percentage change in EBIT.
Let's take the case of P.
Assume 10% increase in EBIT

	Original	After 10% increase in EBIT
EBIT	600	660
Less: Interest	400	400
Earning Before Tax	200	260
No. of Equity Shares	400	450
EPS	0.44	0.57

$$\text{Percentage Change in EPS} \quad = \frac{0.57 - 0.44}{0.44} \times 100 = 30\%$$

$$\text{DFL} \quad = \frac{\text{Percentage change in EPS}}{\text{Percentage change in EBIT}} = \frac{30}{10} = 3$$

Similar calculations for other cases Q and R can be done where the results are bound to be the same as calculated earlier.

3. A simplified income Statement of Zodiac Ltd. is given below. Calculate and interpret its degree of operating leverage, financial leverage and degree of combined leverage.

Zodiac Ltd.

Income Statement for the year to 31st March, 2004	
Particulars	Rs.
Sales	1000000
Variable cost	750000
Fixed cost	75000
EBIT	175000
Interest	60000
Taxes (30%)	34500
Net Income	80500

Solution:

(i)   Computation of Operating Leverage

$$\text{DOL} \quad = \frac{\text{Contribution}}{\text{EBIT}}$$

Contribution
= Sales – Variable cost
= 1000000 – 750000
= Rs. 250000

EBIT
= Contribution – Fixed Cost
= 250000 – 75000
= Rs. 175000

$$\text{DOL} \quad = \frac{250000}{175000} = 1.42$$

(ii)   Computation of Financial Leverage

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

$$= \frac{175000}{175000 - 60000} = \frac{175000}{115000}$$

$$= 1.52$$

(iii) Computation of Combined Leverage

$$DCL = \frac{Contribution}{EBT}$$

$$= \frac{250000}{115000}$$

$$= 2.17$$

Interpretation

(1) DOL of 1.42 suggests that 1% change in sales will lead to a change of 1.42 % EBIT.

(2) DFL of 1.52 signifies that 1% change in EBIT will result in 1.52% change in EBT (Earning Before Taxes)

(3) DCL of 2.17 indicates that 1% change in sales will lead to 2.17% change in EBT (Earning before Taxes)

13.6 Exercise

Answer the following questions

1. Explain the term operating leverage, financial leverages, total leverage?

2. State the needs for studying various types of leverages?

3. Explain various types of structural leverages?

4. Explain the concept of Indifference point in leverage analysis?

5. Explain the concept of Break even analysis in leverage analysis?

13.7 Practical Exercise

1. From the following information available for four companies, namely P, Q, R, S, calculate:

    (i)   EBIT   (ii)   EPS

    (iii)   Operating Leverage   (iv)   Financial Leverage

Particulars	P	Q	R	S
Selling price per unit (Rs.)	20	20	25	30
Variable cost per unit (Rs.)	10	15	20	25
Quantity (Nos.)	20000	25000	30000	40000
Fixed Cost (Rs.)	50000	40000	50000	60000
Interest (Rs.)	15000	30000	35000	40000
No. of Equity Shares	5000	9000	13000	12000

2. Find the operating Leverage from the following data:

    a) Sales   Rs.50000

       Variable costs   40%

       Fixed costs   Rs.12000

    b) Find the Financial Leverage from the following data:

       Net worth   Rs.2500000

       Debt/Equity   3/1

       Interest Rate   10%

       `Operating Profit   Rs.2000000

3. From the following information available for three companies namely A, B, C calculate:

(i) EBIT   (ii) EPS   (iii) Operating leverage and   (iv) Financial leverage.

	A	B	C
Selling price per unit (Rs.)	30	40	50
Variable cost per unit (Rs.)	25	35	45
Quantity (Nos.)	30000	25000	30000
Fixed costs (Rs.)	30000	40000	50000
Interest (Rs.)	15000	25000	35000
Tax Rate (%)	50	50	50
No. of Equity shares	10000	10000	12000

Unit :14:
Capital Structuring

Introduction

A firm needs funds which, depending upon their maturity period, can be classified as long-term and short-term sources. The former consists of capital, reserves and tenn loans raised from financial institutions and the public, while the later is made up of current liabilities and provisions. Financing decision involve raising funds for the firms. It is concerned with formulation and designing of capital structure or leverage. Capital Structure theory is related mainly with deciding the components and the quantum of capital mix. In the capital mix, either we can use owned capital or borrowed capital after considering pros and cons of both types of capital. Thus while investment decision are related to the asset side of the balance sheet, financing decision are related to the liabilities and equity side. The an ideal capital structure can be formulated by combining debts and equity ideally with a view to maximizes market value of the company's share or minimizes the average cost of its capital. Various factors needed to be kept in mind while determining an optimum capital structure for the company.

Structure of the Chapter:

14.1 Objectives:

At the end of this chapter the student will learn about –

- ❑ Meaning and importance of capital structure
- ❑ Various types of capital structure
- ❑ Determination of optimum capital structure
- ❑ Capital structure theories

14.2 Capital Structure: Meaning

According to West and Bringham, 'Capital structure is the permanent finance of the firm represented by long-term debt, preferred stock and net worth.'

Capital structure ordinarily implies the proportion of debt and equity in the total capital of a company. The term 'structure' has been associated whit the term 'capital'. The term 'capital' may be defined as the long-term funds of the firm. Capital is the aggregation of the items appearing on the left hand side of the balance sheet minus

current liabilities. In other words capital may also be expressed as follows: Capital = Total Assets – Current Liabilities. Further, capital of a company may broadly be categorized into 'equity' and 'debt'.

- Debt consists of the following:

  All borrowings from Government, Semi-Government,
  Statutory financial corporations and other agencies
  + Term Loans from Banks, financial institutions etc.
  + Debentures + All deferred Payment Liabilities

- Equity consists of the following:

  Equity share capital + Preference share capital
  + Share premium + Free reserve + Surplus profits
  + Discretionary provisions for contingency
  + Development rebate reserve

14.3 Costing and Risk

Cost and Risk may be considered as two factors to be taken in to account while deciding capital structure. The word 'costing' relates to the ascertainment of cost of capital from different sources viz., equity capital, preference capital, debentures, long-term loans etc. Normally, the debt component in the capital structure reduces the weighted average cost of capital as the interest payment on debt capital is allowed as tax benefit. But against that if the debt component is increased in the capital mix that would increase the risk for the equity shareholders which and they would ask for higher return for the risk they are bearing and so the overall weighted average cost of capital would increase. The most crucial decision of any company is involved in the formulation of its appropriate capital structure. The best design or structure of the capital of a company obviously helps the management to achieve its ultimate objectives of minimizing overall cost of capital, maximizing profitability and also maximizing the value of the firm. These will in turn help to maximize the earning per share (EPS). It is thus apparent that the design of the capital structure of a company may have some bearing on the profitability of that company.

Capital structure decision assume vital significance in corporate financial management due to their influence both on return and risk of the shareholders. The lose nexus between optimum/judicious use of debt and the market value of the firm is well recognized in literature. Whereas an excessive use of debt may endanger the every survival of the corporate firm, a conservative policy may deprive the corporate firm of its advantages in terms of magnifying the rate of return to its equity owners.

The capital structure decision of a firm is concerned with the determination of debt equity composition. Proper planning of the composition is necessary for sound financial management since the debt-equity mix or financial leverage has implications for the shareholders earnings and risk, which in turn, will affect the cost of capital and the market value of the firm. Various theories of capital structure have been profounded in explaining the relationship between market value of the firm and its capital structure decision. However, no theory has proved to be of practical significance. In practice,

planning an optimum capital structure is the most difficult task as the decision is influence by many of factors, which are highly psychological, conflicting, complex and qualitative in nature, thus adding to the worries of financing executives.

All companies should have well defined capital structure policy, otherwise it may face problem of raising fund and financing the projects in the long-term. An appropriate capital structure decision may improve the value as well as solvency position of the company. There would be two opposite effects if debt exists in the capital structure overall cost of capital may reduce as proportion of debt increases in the capital structure due to low cost of debt. On the other hand, because of fixed contractual obligation the financial risk of the company increases – which again increases the weighted average cost of capital. It is said theoretically that optimum capital structure implies a ratio of debt and equity at which weighted average cost of capital would be the least and the market value of the share of the firm would be the highest.

14.4 Financial Structure vs. Capital Structure

Financial Structure in the entire left hand side of the company's balance sheet which includes current liabilities (equivalent to asset structure). While capital structure refers to sources of long-term funds means assets minus current liabilities.

Total Capital Structure

The term total capital structure denotes mix of owner's funds and outsider' funds or it is proportionate relationship of firm's permanent long-term financing represented by equity and debt.

14.5 Relationship between Capital Structure and Profitability

It is compulsion on the part of the company to pay yearly interest on the debt component of the company. Where as the dividend to the equity shareholders will be paid if there are profits with the company during the year. Ordinary, increase in debt in the capital structure i.e., improvement of debt-equity ratio implies greater amount of interest payment than before. So, the company must have to be sure enough of getting steady return so as to earn the additional burden of interest. Likewise, profitability depends, inter alia, on cost of capital. Actually, a negative correlation should always exist between cost of capital and profitability. So, increase in cost of capital means decrease in profitability.

Since acceptance of more and more debt means payment of greater amount of interest, the company must have to think twice about its effect on profitability. If due to acceptance of debt, profitability decreases i.e., a negative correlation results, such debt acceptance will not be advantageous to the company. On the other hand, if any change in the capital structure by way of increasing the proportion of debt can affect the profitability favourably then such change i.e., increase in debt may be considered beneficial to the company.

14.6 Patterns of Capital Structure:

By considering different available source of finance and their combinations, following types of capital structures can be created.

1. Capital structure with equity shares only.
2. Capital structure with equity shares and preference shares.
3. Capital structure with equity share and debentures.
4. Capital structure with equity shares, debentures and preference shares.

After considering pros and cons of each type of capital mix an ideal capital structure should be selected.

14.7 Determination of Optimal Capital Structure

Many factors will be taken into account by the companies at the time of generating capital for the company or at the time of deciding capital mix of the company. Normally, there are two components of the capital mix viz. debt and equity. A finance manager of a company should consider the pros and cons of both the type of capital at the time of determination of capital mix. Ordinary new companies cannot collect sufficient debt as per their requirements so easily because they are yet to establish their creditworthiness in the market. Naturally, they have to depend on equity very much. But established companies generally have track record of their profit earning capacity, which helps them to create their creditworthiness. The lenders feel safe to invest their funds in this type of companies. Naturally, there is ample scope for this type of companies to collect debt. But a company cannot accept debt freely i.e., without having any limit. The company must have to chalk out a plan to collect debt in such a way that the acceptance of debt becomes beneficial for the company in terms of increase in EPS, profitability and value of the firm.

If the cost of capital is greater than the return, it will have an adverse effect on company's profitability, value of the firm and its EPS. Similarly, if company is unable to repay the debt within the scheduled period, it will affect the goodwill of the company in the credit market and consequently may create problems in future for collecting further debt. Other factors remaining constant, the company should select its appropriate capital structure with due consideration.

Significant variations with regard to capital structure can easily be noticed among industries and among firms within the same industry. So it is difficult to generate the model capital structure for all business undertakings. Theoretical and empirical research suggest that financial planner should plan optimal structure.

In practice, financial management literature does not provide specified methodology for designing a firm's optimum capital structure. Consequently human judgment must be used to resolve the many conflicting forces in laying plans for the types of funds to be sought.

Capital structure policy involves a choice between risk and expected return. The optimal capital structure strikes a balance between these risks and returns and thus examines the price of the stock. These companies who do not design their capital structure in a pre-planned way, realize difficulties in raising funds on favorable terms in the long-run to finance its development plans.

Advantages of Debt capital

The main advantages of debt capital are as follows:

- Cost advantage due to the ability to set debt interest against profit for tax purposes.
- The pre-tax rate of interest is invariably lower than the return required by the equity capital suppliers.
- The administrative and issuing costs are normally lower than raising equity capital.

14.8 Debt-Equity Ratio Analysis

At the time of determining debt-equity in a capital mix, two main factors must be considered first is the cost of capital and the second is risk. From cost of capital point of view, debt capital is cheaper than equity capital as the interest payment on a debt is an allowable expenditure for the taxation purpose whereas the dividend is not allowed as expenditure. Whereas from risk point of view, more debt in capital mix increases more risk and vice versa. Different studies, so far conducted, fail to reach unanimity as to the appropriate debt-equity ratio. One such study conducted by B.K. Madan suggested 2 : 1 as the standard debt-equity ratio. But at the same time, he opined that the standard ratio may vary depending on the nature of the company. Low debt-equity ratio does not necessarily mean such dependence on collecting funds by equity issues. It may also be so due to increase in the retained earnings component of 'equity'. Again, it is equally pertinent to note that a highly profitable company may keep aside a sizeable portion of its profit in the reserve fund. It may help the company, not to rely on external debt to meet further requirement of the funds and accordingly debt-equity ration may appear to be at a low level.

The following points should be considered before selecting the firm's debt-equity ration:

- Increasing equity can be used as a base to justify and sustain more debt.
- In balancing debt-equity ratio, the first step always should be the increase of equity which gives more financial flexibility.
- The trade cycles and industry cycles and other reason may some times cause financial distress to the firm and hence the debt-equity ratio should be selected keeping in view the distress conditions which may occur in future.   ,
- Survival of the firm is the top priority of an firm and hence the lower debt-equity ratio is preferable for thigh risk business firms.
- The debt-equity ratio depends on both the level and volatility of cash flows.
- There is an optimal capital structure where the marginal tax benefit is equal to the marginal cost of anticipated financial distress. ·

The debt-equity ratio affects the firms cost of capital, when a debt-equity ratio of a firm increase, its cost of capital will decline and vice versa. When a firm depends on higher debt, result in payment of interest to the suppliers of loan capital which will lower the amount of tax payable by the company, and simultaneously its overall cost of capital

will also decrease. But, any non-payment of principal and interest payments of the loans outstanding may result in bankruptcy costs.

14.9 EBIT-EPS Analysis

It is one of the basic objectives of Financial Management to design an appropriate capital structure which can provide the highest EPS over the firm's expected range of EBIT. EPS is a yard stick to evaluate the firm's performance for the investors. The level of EBIT varies from year to year shows how successful the firm's operation are. EBIT – EPS approach is an important tool for designing the optimal capital structure framework of the firm. EBIT – EPS analysis widely used by Finance Manager because it provides a simple picture of the consequences of alternative financing methods.

14.10 Risk Return Trade Off

The firm's decision to use or otherwise debt in the capital structure affects two types of risks, namely, Financial Risk (FR) and Risks arising out of 'Non-Employment of Debt Capital', hereby called "NEDC Risks". The former risk arises out of the use of the debt capital while the latter is the outcome of the use of only equity or more of equity and less of debt in the capital mix.

A balance that an investor must establish between the desire for low risk and and the lure high returns. Low levels of uncertainty (low risk) are associated with low potential returns, whereas high levels of uncertainty (high risk) are associated with high potential returns.

The higher the potential return, the more risk the firm will face.

Thus The relation between risk and return that usually holds, in which one must be willing to accept greater risk if one wants to pursue greater returns. also called risk/reward trade-off.

Financial Risk –

The financial risk arises on account of the use of debt in the capitalization plan. The debentures carry fixed obligations as to return on capital and return of capital. Lack of ability to honour these fixed obligations increases the risk of liquidation. In addition, the use of debt also increases the variability of earnings available to equity holders.

The risk that the cash flow of an issuer will not be adequate to meet its financial obligations. Also referred to as the additional risk that a firm's stockholder bears when the firm uses debt and equity.

NEDC Risks –

The financial executives have to manage not only financial risk but also risks arising of non-employment of debt capital in the capital structure, called NEDC Risks. These risks vary inversely with the ratio of Debt to Total Capital (D/C Ratio). The greater the value of D/C ratio, the lower will be the NEDC risks and vice versa, other things being equal.

While deciding capital mix following factors need consideration:

- In determining the optimum level of the debt-equity combination, the financial executives have to balance the financial risk and NEDC risks by minimizing the total risk/costs. The optimum capital structure is there at the point where the total risk/cost is minimum.
- Further, between debt and equity, equity is more expenses to serve. Servicing costs are the costs incurred in distributing dividend/interest cheques, distribution of audited reports, meeting expenses etc. The total servicing cost varies with the amount of equity issue. Greater the amount of equity issue, higher would be the servicing costs.
- Another important component of the risk arising out of non-employment of debt capital is the floatation costs Generally the cost of floating debt is less than the cost of floating an equity issue. Floatation costs minimizing firms should think of issuing less of equity and more of debt as the total amount of floatation cost varies inversely with the D/C ratio.
- The forth component of the NEDC risks is the risk of increased inflexibility arising out of issue of equity shares only. Between debt and equity, the latter is more inflexible in nature than the former. Equity issue cannot be redeemed during the life time of the company while debenture are redeemed at the end of maturity period. As a result, inflexibility risk increase with the decreases in the D/C ratio.
- Financial plan should be compatible with the management objective of retaining control. Existing managements are allergic to the very idea of loosing control over the affairs. The risk of loss of control increases with the increases in the proportion of equity to total capital and vice versa. In other words, it moves inversely with the D/C ratio. This is because ordinary shareholders have legal right to elect the directors of the company. The greater the number of equity shares outstanding, the more will be the risk of losing control.
- The excessive reliance on equity source leads to the sacrifice of the opportunity of earning higher EPS on account of beneficial effects of financial leverage.

Assumption in Risk – Return –off

- Market price and face value remain constant.
- Issue cost per share is higher than per debenture and both remain constant.
- EBIT/Operating Profits are constant
- Investors are rational
- The total financing of the company is given.
- Servicing cost per share is higher than per debenture and both remain constant
- The total assets are constant
- There are only two sources of funds, namely debt and equity

14.11 Basic Assumption in Capital Structure Theories – The study of the following basic assumption is necessary before we study the capital structure theories under traditional and modern views:

- The continuous and perpetual earning of profits to the expectations of the stockholders.

- There are no transaction costs and a company can alter its capital structure without any transaction costs.
- Business risk is treated constant at different capital structure of a company.
- The taxation and its effect on cost of capital is ignored
- The company distributes all its earnings as dividends to its shareholders and no consideration of dividend and retention policies.

14.12 Weighted Average Cost of Capital (Traditional view)

The cost of capital is interdependent on the degree of leverage. The lowest component in the cost of capital relates to the fixed interest bearing investments. Traditionally, optimal capital structure is assumed at a point where weighted average cost of capital (WACC) is minimum. For a project evaluation, this WACC is considered as the minimum rate of return required form project to pay-off the expected return of the investors and as such WACC is generally referred to as the required rate of return.

WACC is defined as the weighted average of the cost of various sources of fiancé. Weight being the market value of each source of finance outstanding and cost of various sources of finance refers to the return expected by the respective investors. The debt component should be raised upto the level till the optimum level reaches, a firm can rise its debt component to minimise WACC and for increasing returns to the equity holders. After the optimum level, any further increase in debt increases the risk to the equity holders.

Firms can borrow at low rate of interest in the beginning. With the increase in leverage, lender beginning to worry about the repayment of interest and principal and security available to them. The interest rate will be higher on additional loans. Therefore, average cost of debt begins to rise.

Simultaneously, when the equity holders will not much bother when the debt levels of the company are lower. But which increasing leverage, the equity holders are much concerned about the level of interest payments affecting the volatility of cash flow for equity. Then the equity holders demand for more rates of return for taking an additional risk. Thus, a combination of both the sources of finance, with the increase in leverage, the overall cost of capital will also start raising after the optimum level of gearing.

WACC is undoubtedly an important tool in determining optimal capital structure. To maximize the value of the firm as well as the market value of stock, the firm should arrive to minimise WACC. Thus considerable weight is placed in WACC for achieving the ultimate objective of increasing the stockholders worth by choosing an appropriate capital mix. Other conditions, likely cash flow, ability of the firm to meet fixed charts, degree of leverage, fluctuations of EBIT and its likely impact on EPS for alternative methods of financing etc. should also be taken into consideration with due weightage for the purpose.

The value of the firm is maximum where the level of gearing for each firm is at level at which the cost per unit of capital is at its lowest point. Therefore, a firm should identify and maintain capital structure at this optimum level.

Thus in practical sense we can term this traditional theory as

Define gearing as D:E
Increasing the level of gearing initially lowers the WACC until the increased risk to share-holders raises the cost of equity to such an extent that it offsets the cheaper debt. There is no empirically confirmed level of gearing at which this happens and gearing levels vary widely across industries (and between firms) but they are usually less than 100% (i.e. 1:1)

14.13 Net Income Approach

Durant David gives this approach. According to this approach, the capital structure decision is relevant to the valuation of the firm. As such a change in the capital structure causes an overall change in the cost of capital and also in the total value of the firm. Higher debt content in the capital structure means a high financial leverage and this results in decline in the overall or weighted average cost of capital. These results in increase in the value of the firm and also increase in the value of the equity share. In an opposite situation, the reverse conditions prevail.

There are usually three basic assumptions of this approach:

- Cost of debt is less than cost of equity i.e., debt capitalization rate is less than the equity capitalization rate.
- Debt content does not change the risk perception of the investors.
- Corporate taxes do not exist.

According to net income approach, the value of the firm and the value of equity are determined as given below:

- **Value of firm (v)**
  $V = S + B$
  Where,
  S = Market value of Equity
  B = Market value of Debt
- **Market value of Equity (S)**

$$S = \frac{NI}{K_e}$$

Where
NI = Net income available for Equity shareholder
K_e = Equity capitalization rate.

14.14 Net Operating Income Approach

According to net operating income approach (NOI) value of the firm is independent of its capital structure. Is assumes that the weighted average cost of capital is unchanged irrespective of the level of gearing. The underlying assumption behind this approach is that the increase in the employment of debt capital increase risk in the business which ultimately increase the expected rate of return by the stockholders and

the benefit of using relatively cheaper debt funds is offset by the loss arising out of the increase in cost of equity.

A change in proportion of various sources of finance cannot alter the weighted average cost of capital and as such, the value of firm remains unaltered for all degrees of leverage. Under this approach optimal capital structure does not exist, as average cost of capital remains constant for varied types of financing mix.

NOI approach is opposite to the NI approach. According to this approach, the market value of the firm depends upon the net operating profit of EBIT and the overall cost of capital, Weighted Average Cost of Capital (WACC). The financing mix or the capital structure is irrelevant and does not affect the value of the firm.

The NOI approach is based on certain assumptions:

- The use of more and more debt in the capital structure increases the risk of the shareholders and thus results in the increase in the cost of equity capital i.e.. K_E
- There is no tax.
- The cost of debt, K_0, is also constant.
- The overall cost of capital, K_0, of the firm is constant and depends upon the business risk which also is assumed to be unchanged.
- The investors see the firm as a whole and thus capitalize the total earnings of the firm to find value of the firm as a whole.

Thus, for a given value of EBIT, the value of the firm remains the same irrespective of the capital composition, and instead it depends upon the overall cost of the capital.

Ascertainment of value of firm and value of equity

- **Value of Firm (v)**

$$V = \frac{EBIT}{K}$$

Where
EBIT = Earnings before interest and tax
K = Overall cost of capital

- **Value of Equity (s)**

$$S = V - B$$

Where

V = Value of Firm
B = Value of Debt

14.15 Modigliani and Miller Theory (Modern View)

The traditional view of capital structure as explained in Weighted average cost of capital is rejected by the proponents Modigliani and Miller (MM) (1958). According to them cost of capital is independent of capital structure and, therefore, there is no optimal value. According to them, under competitive conditions and perfect markets, the choice between equity financing and borrowing does not affect a firm's market value because the individual investor can alter investment to any mix of debt and equity the investor desires.

For two firms with identical business risk and level of earnings, the cost of capital (Ko) is independent of the level of gearing and is equal to the cost of capital for an all-equity firm.

This amounts to saying that the value of a firm depends solely upon the level of earnings and the risk involved. 'The size of the pie is the same, however it is shared out'.

Assumptions of MM Theory – The MM Theory is based on the following assumption:

- Investors are rational and except other investors to behave rationally.
- The stock markets are perfectly competitive.
- The firm's investment schedule and cash flows are assumed constant and perpetual.
- Firms exist with the same business or systematic risk at different levels of gearing.
- There are no taxes or transportation costs.
- Perfect capital market s exist where individuals and companies can borrows unlimited amounts at the same rate of interest.

The basic idea is that in perfect capital markets investors can create their own 'home-made gearing'. Thus there is nothing that a firm can do by choosing a capital structure that people cannot do for themselves, so the firm cannot add any value which investors are willing to pay for. Investors are indifferent between all capital structures. If two firms with same earnings and same business risk do have different capital structures and values, arbitrage will eliminate this.

Example

Two firms have identical earnings of Rs. 10,000 and same business risk. A is an all-equity firm while B has a gearing ratio of 75%. The return on A's equity is 15%. The interest paid by B on its debt is 12%. Because of the gearing, its cost of equity capital is slightly higher than A's at 16%. However, its overall WACC is lower than As and so B has a higher market value.

	Firm A	Firm B
Earnings	Rs. 10,000	Rs. 10,000
Interest on debt		Rs. 3,600
Earnings available to shareholders	Rs. 10,000	Rs. 6,400
Equity return (Ke)	0.15	0.16
Interest on debt (Kd)	—	0.12

Market value of shares (E)	Rs. 66,667	Rs. 40,000
Market value of debt (D)	Rs. 30,000	
Total value of firm	66,667	70,000
Overall cost of capital (Ko)	15%	14.3%

Arbitrage steps:

1. assume you are a rational investor owning 1 per cent of the shares in B (=Rs. 400)
2. sell these shares for Rs. 400
3. borrow Rs. 300. Notice that this is equal to 1% of the debt owed by firm B which you also 'owned' before the sale of shares.
4. buy 1% of shares in firm A for Rs. 666.67

Note that your income is now 15% on Rs. 666.67 = Rs. 100. This compares with 16% on Rs. 400 = Rs. 64. Clearly better? But wait. You have borrowed Rs. 300 at 12%. This interest (=Rs. 36) must be deducted. Rs. 100-36 = Rs. 64. But you earn this Rs. 64 on a personal investment of

Rs. 366.67 (=Rs. 666.67 - Rs. 300). Investing in A is preferable to investing in B.

If investors are rational and well-informed, investors in B will sell and buy shares in A.

14.16 MM Theory: Arbitrage –

The work 'arbitrage' is a technical term referring to a situation where two identical commodities are selling in the same market for different prices, then the market will reach equilibrium by the dealers start buying at the lower price and sell at the higher price, thereby making profit. The increase in demand will force up the price of the lower priced goods and increase in supply will force down the price of the high priced commodities.

If two different firms with same level of business risk but different levels of gearing sold for different values, then shareholders would move from over valued firm to the under valued firm and adjust their level of borrowing through the market to maintain financial risk at the same level. The shareholders would increase their income through this method while maintaining their net investment and risk at the same level. This process of arbitrage would drive the price of the two firms to a common equilibrium total value.

The arbitrage in MM theory show that the investor will move quickly to take advantage and will make profit in an equilibrium capital market, then this would represents an arbitrage opportunity.

MM Theory: Corporate Taxation –

In our previous discussion, MM theory has outrightly ignored the tax relief on debt interest by making an assumption that no corporate tax exist. MM has further modified their theory by considering tax relief available to a geared company when the debt component is existing in the capital structure. The tax burden on the company will lessen to the extent of relief available on interest payable on the debt, which makes the cost of debt cheaper which reduces the weighted average capital of the firm to the lower where capital structure of a company has debt component.

14.17 Factors Influencing Capital Structure Decisions

In reality the following factors have a great practical implication for capital structure.

– Tax advantage of debt:

The first factor is the tax advantage of debt. Interest paid on debt is deductible from income and reduces a firm's tax liabilities, therefore, debt has a tax advantage over equity and by increasing the amount of debt issued, a firm increases its earnings available to shareholders.

– Financing decision and firm's risk exposure:

The third factor is the impact of financing decision on the riskiness of a firm. As firms pile on more and more debt, their ability to meet fixed interest payments out of current earnings diminishes. This generates the probability of bankruptcy and as a result, the cost (or risk premium) of both debt and equity rises.

– Control of Firm:

When the promoters do not wish to dilute their control, the company, may rely more on debt funds than by issue of fresh shares. If they issue new share then the new shareholders will participate in the control of management which they probably do not want. So when the promoters want to keep the control of management with them they should issue more debt than equity capital.

– Conditions of money market:

In boom condition in money market, the investors will be willing to invest in equity shares with expectations of high equity dividends. But in the times of depression, they will look for safe income and will be willing to invest in debentures. So, ordinary shares should be issued during boom period, while debentures and should be issued in times of depression.

– Flexibility:

It is more important consideration with the raising of debt in capital structure. As and when the funds required, the debt may be raised and it can be paid off and when desired. But in case of equity, once the fund raised through issue of equity shares, it cannot ordinarily be reduced except with the permission of the court and compliance with lot of legal provisions. Hence, debt capital, has got the characteristic of greater flexibility than equity capital, which will influence the capital structure decisions.

– Timing:

The time at which the capital structure decision is taken will be influenced by the boom or recession conditions of the economy. In times of boom, it would be easier for the firm to raise equity, but in times of recession, the equity investors will not show much of interest in investing. Then the firm is to rely in raising debt.

- **Nature of Business:**

The nature of business can have strong effect on the pattern of capital structure. A business with fixed and regular income can rely on debentures and preference shares which needs regular payment of dividend and interest. But if the business is risky and its income is unstable, ordinary shares should be relied upon, because the payment of dividend on such shares is optional.

- - **Legal provision:**

Legal provision in raising capital will also play a significant role in planning capital structure. Raising of equity capital is more complicated than raising debt from legal point of view.

- **Profitability of the company:**

A company with higher profitability will have low reliance on outside debt and it will meet its additional requirement through internal generation.

- **Growing companies:**

The growing companies will require more and more funds for its expansion schemes, which will be met easily through raising of debt.

14.18 Practical

1. Earning before interest and taxes (EBIT) of Rux Ltd.is Rs.80000. The equity capitalization rate (K_e) is 10 per cent. The capital structure of this company consists of equity shares of Rs.10 each and Rs.400000 worth of 8 % debentures. In this case the value of the company market value of its equity shares and overall cost of its capital will be as follows:

	Rs.
Earning before interest and taxes	80000
Less: Interest on 8 % debentures of Rs.400000	32000
Net income available to equity shareholders	48000
Equity Capitalization Rate	10%
Market value of equity shares on the basis of earnings 48000 x 10	480000
Plus market value of debentures	400000
Market value of the firm (company)	880000

(Value of Firm = S + D where S = Market Value of Share and D = Market Value of Debt)

On the basis of above figures, the overall cost of capital will be as follows:

$$K_o = \frac{EBIT}{V}$$

Where K_o = the overall cost of capital
EBIT = income before interest taxes

$$V \qquad = \text{total market value of the firm}$$

$$\therefore K_o = \frac{80000}{880000} = \frac{1}{11}$$

= 0.099 or 9.9 per cent.

Now, to measure the effect of change in capital structure, let us assume that debentures are increased by Rs.100000 while equities are reduced to the same extent..

Earning before interest and taxes	Rs.80000
Less: Interest on 8 per cent debentures of Rs.500000	Rs.40000
Profit available to equity shareholders	Rs.40000
Value of equity shares on the basis of capitalization of earning 40000 / 0.10 =	Rs.400000
Plus market value of debentures	Rs.500000
Overall value of debentures	Rs.900000

The rate of overall cost of capital will, therefore be as follows:

$$Ko = \frac{EBIT}{V} = \frac{80000}{90000} = \frac{8}{90}$$

= 0.088 or 808 per cent

The above calculations reveal that

(i) When the ratio of debts to equity shares is raised, the overall value of the company increases from Rs.80000 to Rs.90000.

(ii) Similarly, the rate of overall cost of capital falls from 9.9 per cent to 8.8 per cent.

Thus the conclusion of the net income approach is that when debts are increased in capital structure of a company, the market value of the firm increase, while rate of overall cost of capital goes down.

2. R Ltd. and S Ltd. both companies belong to the homogenous risk group. Both companies are identical in all respects except that A is a levered company, while B is an unleveled company. The capital structure of the levered company A includes 10 % debentures of Rs.500000. The total assets of both the companies are worth Rs.1200000; and both earn 15% return before taxes and interest on their assets.

Assuming that capital market is perfect, investors behave rationally, tax rate is 50 per cent and rat of equity capitalization is 15%, compute the following:

(1) the value of company R and S on the basis of the Net Income Approach.

(2) The value of both these companies on the basis of the Net Operating Income approach.

Solution:

(1) First, we shall compute the value of these companies with the help of net income approach. Remember that net income available to equity shareholders should be calculated and by capitalizing it, we would obtain the value of a company. On the other hand, in the net operating income approach, the net operating income itself is directly capitalized to obtain the value of a company.

	R Company (Rs.)	S Company (Rs.)
Net operating income (EBIT) (16% on Rs.1200000)	180000	180000
Less: 10 % interest on Rs.500000	50000	
	130000	180000
Less: 50% taxes	65000	90000
Net Income (NI)	65000	90000
Rate of equity capitalization	15%	15%
Market value of equity share (S)	433333	600000
Market value of debentures (D)	500000	--
Value of the company (V)	933333	600000

(2) We shall now calculate the value of the company with the help of net operating income approach.

$$\text{Value of the un-levered company} = \frac{\text{EBIT}(1-t)}{K_e}$$

$$= \frac{180000\,(1-.5)}{15\%}$$

$$= \frac{90000}{15\%}$$

$$= \text{Rs.}600000$$

Value of the levered company = Value without leverage + Debt (1-t)
= Rs.600000 + 500000 (0.5)
= Rs.600000 + 250000
= Rs.850000

3. Companies B and C are identical in all respects except that company M is unlevered; while capital of company B includes 12% debenture of Rs.400000. If tax rate is 50%, net operating income is Rs.120000 and rate of equity capitalisation is 10 per cent, calculate the following:

If all the conditions of M-M approach are satisfied, compute the market values of both companies.

Solution:

As we stated earlier,

$$\text{Market value of unlevered company} = \frac{\text{EBIT}(1-t)}{\text{Ke}}$$

$$= \frac{\text{Rs.}120000\,(1-.5)}{10\%}$$

$$= \frac{\text{Rs.}120000 \times .5}{0.10\%}$$

$$= \frac{60000}{10} \times \frac{100}{1}$$

$$= \text{Rs.}600000$$

Market value of levered company
= Value without leverage + debts (1 - t)
= Rs.600000 + Rs.400000 (1 - t)
= Rs.600000 + Rs.200000

= Rs.800000

4. According to traditional approach, the market value of company R and S are as under:

	R	S
Net operating income (EBIT)	Rs.60000	Rs.60000
Cost of debts	0	20000
Net income available to equity shareholders	60000	40000
Cost of equity capital (K_e)	0.10	0.11
Market value of equity capital (S)	550000	350000
Market value of debts (D)	0	200000
Total value of the company (V)	550000	550000
Average cost of capital (K_o)	10.9	10.9

According to M-M approach, calculate the cost of capital and the value of company R and S. Assume that (1) there are no taxes and (2) the rate of equilibrium value is 12.5%.

Solution:

We know that M-M approach is essentially net operating income approach in which the overall value of a company is obtained by capitalizing its net operating

income. We shall therefore, use the same method to calculate the values of company R and S.

The rate of capitalisation is 12.5%

	Company R	Company S
Net operating income	Rs.60000	Rs.60000
Rate of capitalisation (Rate of equilibrium value)	0.125	0.125
Overall value of the company on this basis	480000	480000
Market value of debts	--	200000
Market value of equity capital	400000	280000

$$\text{Cost of equity capital} = \frac{60000}{400000} \qquad \frac{40000}{280000}$$

$$= 15\% \qquad 14.28\%$$

At this point both financial alternatives have the same EPS.

5. Sakar Ltd. earned a profit of Rs. 20 lakhs before providing for interest and tax. The company's capital structure is as follows :

(i)   4,00,000 Equity shares of Rs. 10 each and its market capitalization rate is 16%.

(ii)   25,000 14% secured redeemable debentures of Rs. 150 each

You are required to calculate the value of the firm under Net Income approach. Also calculate the overall cost of capital of the Firm.

**

Value of the Firm(V)

$V = S + B$

Where

S = Market value of Equity

B = Market value of Debt

Working notes

(i) Calculation of Net Income (N)

	Rs.
Profit before Interest and tax	20,00,000
Less : Debenture interest @ 14%	5,25,000
Net income available to equity shareholders	
	14,75,000

(ii) Market value of Equity (S)

$$S = \frac{NI}{K_e}$$

Where

NI = Net income available for equity shareholders i.e. Rs. 13,00,000

Kc = Equity Capitalization rate i.e. 16% or 0.16

$$S = \frac{Rs.14,75,000}{0.16} = Rs. 14,75,000 = Rs. 92,18,750$$

Now, we can calculate the value of the Firm

$V = S + B$

$= Rs. 92,18,750 + Rs. 37,50,000 = Rs. 1,29,68,750$

Calculation of overall cost of capital

$$K_c = \frac{EBIT}{V}$$

$$= \frac{Rs.20,00,000}{Rs.1,29,68,750} \times 100 = 15.42\%$$

6.S Ltd. and M Ltd. are identical in all respects including risk factors except for debt/equity mix. Summer Ltd. having issued 12% debentures of Rs. 30 lakhs, while Winter Ltd. issued only equity capital. Both the companies earn 24% before interest and taxes on their total assets of Rs. 50 lakhs. Assuming the corporate effective tax rate of 40% and capitalization rate of 18% for an all-equity company. Compute the value of Summer Ltd. and Winter Ltd. using (i) Net Income approach and (ii) Net operating Income approach.
**

(i) Valuation of companies under Net Income Approach

Calculation of Net Income available for Equity Shareholders   (Rs.)

Particulars	S Ltd.	M Ltd.
Profit before interest and tax	12,00,000	12,00,000
Less : Debenture interest (@ 12%)	3,60,000	-
Profit before tax	8,40,000	12,00,000
Less : Tax @ 40%	3,36,000	4,80,000
Net Income available to Equity Shareholders	5,04,000	7,20,000

• Market Value of Equity (s)

$$S = \frac{NI}{K_e}$$

Where

NI = Net income available to Equity Shareholders

Kc = Equity Capitalisation rate

S Ltd. $= \dfrac{Rs.5,04,000}{0.18} = Rs. 28,00,000$

M Ltd. $= \dfrac{Rs.7,20,000}{0.18} = Rs. 40,00,000$

• Market Value of Firm (v)

$V = S + B$

Where

S = Value of Equity

B = Value of Debt

S Ltd.

V = Rs. 28,00,000 + Rs. 30,00,000 = Rs. 58,00,000

M Ltd.

V = Rs. 40,00,000 + 0   = Rs. 40,00,000

(ii) Valuation of companies under Net Operating Income approach

Particulars	S Ltd.	M Ltd.
Capitalization of earning at 18% $\left(\dfrac{12,00,000(1-0.4)}{0.18}\right)$	40,00,000	40,00,000
Less : Value of Debt [Rs. 30,00,000 (1-0.4)	18,00,000	
Value of Equity	22,00,000	40,00,000
Add : Value of Debt	30,00,000	
Total Value of company	52,00,000	40,00,000

14.19 Exercise

Answer the following questions

1. Define capital structure and state its importance in studies of financial management?
2. Explain the effects of cost factor and risk factor in determining capital structure?
3. Explain debt-equity analysis in capital structure?
4. How to determine optimum capital structure?
5. State the various factors which can affect in determining capital structure?
6. Explain weighted average cost of capital theory in capital structure studies?
7. Explain net income theory in capital structure studies?
8. Explain net operating theory in capital structure studies?
9. Explain arbitrage process in MM theory in capital structure studies?

14.20 Practical Exercise

1. Two firm c Ltd. and d Ltd. are identical in all respects except that while there is no leverage in A, While B has 10% debentures of Rs.500000. Assuming that tax rate is 50 %, net operating income is Rs.160000 and equity capitalisation rate is 12 % compute the market value of both these companies assuming that all the assumptions of M-M approach are met.

2. The values of two firms P Ltd. and Q Ltd. are as follows according to traditional approach:

	P Ltd.	Q Ltd.
Net operating income (EBIT)	Rs.80000	Rs.80000
Cost of debts	0	Rs.20000
Net income	Rs.80000	Rs.60000

	0.120	0.125
Cost of equity capital (K_e)		
Market value of equity (S)	Rs.660000	Rs.480000
Market value of debts (D)	0	Rs.200000
	Rs.660000	Rs.680000
Average cost of capital (K_e)	0.1212	0.1177

Calculate the values of firms P and Q and cost of capital also on the basis of M-M theory. Assume that (1) corporate taxes do not exist and (2) the rate of equilibrium value is 16 per cent.

3. Assuming no taxes and given the earnings before interest and taxes (EBIT), interest (I) at 10 per cent and equity capitalisation rate (k_e) below, calculate the total market value of each firm.

Firms	EBIT	I	k_e (per cent)
X	Rs 2,10,000	Rs 20,000	12
Y	3,20,000	60,000	16
Z	5,00,000	2,00,000	15
w	6,00,000	2,40,000	18

Also, determine the weighted average cost of capital for each firm.

4. Company X and Company Y are in the same risk class, and are identical in every respect except that company X uses debt, while company Y does not. The levered firm has Rs 9,10,000 debentures, carrying 10 per cent rate of interest. Both the firms earn 20 per cent operating profit on their total assets of Rs 15 lakhs. Assume perfect capital markets, rational investors and so on; a tax rate of 35 per cent and capitalisation rate of 15 per cent for an all-equity company.

(a) Compute the value of firms X and Y using the Net Income (NI) Approach.

(b) Compute the- value of each -firm using the Net Operating Income (NOI) Approach.

(c) Using the NOI Approach, calculate the overall cost of capital $(k_0\backslash$ for firms X and Y.

(d) Which of these two firms has an optimal capital structure according to the NOI Approach? Why?

5. Companies U and L are identical in every respect, except that U is unlevered while L is levered. Company L has Rs 20 lakh of 8 per cent debentures outstanding. Assume (1) that all the MM assumptions are met, (2) that the tax rate is 35 per cent, (3) that EBIT is Rs 6 lakh and that equity-capitalisation rate for company U is 11 per cent.

(a) What would be the value for each firm according to the MM's Approach?

(b) Suppose V_u - Rs 25,00,000 and Vi = Rs 35,00,000. According to MM do they represent equilibrium values? If .not, explain the process by which equilibrium will be restored.

6. The values of two firms X and Y in accordance with the traditional theory are given below:

	X	Y

Expected operating income (X)	Rs 50,000	Rs 50,000
Total cost of debt (k0 - D = R)	0	10,000
Net income (X - R)	50,000	40,000
Cost, of equity (fcg)	0.10	0.1111
Market value of shares (S)	5,00,000	3,60,000
Market value of debt (D)	0	2,00,000
Total value of firm (V = S + D)	5,00,000	5,60.000
Average cost of capital (K$_0$)	0.10	0.09
Debt equity ratio	0	0.556

Compute the values of firms X and Y as per the MM thesis. Assume that (i) corporate income taxes do not exist, and (ii) the equilibrium values of ko is 13.5 per cent.

7. The two companies, U and L, belong to an equivalent risk class. These two firms are identical in every respect except that U company is unlevered while Company L has 10 per cent debentures of Rs 32 lakh. The other relevant information regarding their valuation and capitalisation rates are as follows:

	Firm U	Firm L
Net operating income (EBIT)	Rs 7,50,000	Rs 7,50,000
Interest on debt (I)	—	3,00,000
Earnings to equityholders (NI)	7,50,000	4,50,000
Equity-capitalisation rate (ke)	0.15	0.20
Market value of equity (S)	50,00,000	22,50,000
Market value of debt (B)	—	30,00,000
Total value of firm (S + B) = V	50,00,000	52,50,000
Implied overall capitalisation rate (k$_0$)	0.15	0.143
Debt-equity ratio (B/S)	0	1.33

(a) An investor owns 11 per cent equity shares of company L. Show the arbitrage process and the amount by which be could reduce his outlay through the use of leverage,

(b) According to Modigliani and Miller, when will this arbitrage process come to an end?

8. A company with net operating earnings of Rs 3,10,000 is attempting to evaluate a number of possible capital structures, given below. Which of the capital structures will you recommend and why?

Capital structure	Debt in capital structure		Ki(%)	K$_e$ (%)
1	Rs	3,00,000	10	12.0
2		4,00,000	10	12.5

3.	5,00,000	11	13.5
4	6,50,000	12	15.0
5	7,00,000	14	18.0

9. A company's current earnings before interest and taxes are Rs 4,20,000. The firm currently has outstanding Rs 15 lakh of debts at an average cost of 10 per cent. Its cost of equity capital is estimated to equal 16 per cent.

(a) Determine the current value of the firm using the traditional valuation Approach.

(b) Determine the firm's overall capitalisation rate and both types of leverage ratios: (i) B/S (ii) B/V.

(c) The firm is considering reducing its leverage by selling Rs 5 lakh of equity in order to redeem a Rs 5 lakh debt. The cost of debt is expected to be unaffected. However, the firm's cost of equity capital is to be reduced to 14 per cent due to decrease in financial risk. Would you recommend the proposed action?

10. Companies U and L are identical in every respect except that the former does not use debt in its capital structure, while the latter employs Rs 6 lakh 10 per cent debt. Assuming that (a) all the MM assumptions are met, (b) the corporate-tax rate is 35 per cent, (c) the EBIT is Rs 1,30,000, and (d) the equity capitalisation of the unlevered company is 0.20, what will be the value of the firms, U and L? Also, determine the weighted average cost of capital for both the firms.

11. From the following selected data determine the value of the firms; P and Q belonging to the homogeneous risk class under (a)the NI Approach, and (b) the NOI Approach:

	Levered firm P	Unlevered firm Q
EBIT	Rs 2,20,000	Rs 2,00,000
Interest (0.10)	50,000	
Equity-capitalisation rate	0.20	
Corporate tax rate	0.35	

12. The following information is available for two firms, Box Corporation and Cox Corporation.

	Box	Cox
Net Operating Income	Rs. 2,100,000	Rs. 2,000,000
Interest on Debt	Nil	500,000
Cost of Equity	15%	15%
Cost of .Debt	10%	10%

(a) Calculate the market value of equity, market value of debt, and market value of the firm for Box Corporation and Cox Corporation.

(b) What is the average cost of capital for each of the firms?

(c) What happens to the average cost of capital of Box Corporation if it employs Rs. 30 million of debt to finance a project that yields an operating income of Rs. 4 million?

(d) What happens to the average cost of capital of Cox Corporation if it sells Rs. 10 million of . additional equity (at par) to retire Rs. 10 million of outstanding debt?

In answering the above questions assume that the net income approach applies and there are no taxes.

The management of Samata Campany, subscribing to the net operating income approach, believes that its-cost of debt and overall cost of capital will remain at 8 per cent and 13 per cent, respectively. If the equity shareholders of the firm demand a return of 20 per cent, what should be the proportions of debt and equity in the firm's capital structure? Assume that there are no taxes.

14. The Bharat Company and the Charat Company belong to the same risk class—these companies are identical in all respects except that the Charat Company has no debt in its capital structure, whereas the Bharat Company employs debt in its capital structure. Relevant financial particulars of the two companies are given below.

	Bharat	Charat
Net Operating Income	Rs. 500,000	Rs. 500,000
Debt Interest	—	Rs. 200,000
Equity Earnings	Rs. 500,000	Rs. 300,000
Equity Capitalisation Rate	12%	14%
Market Value of Equity	Rs. 4,166,667	Rs. 2,142,857
Market Value of Debt	—	Rs. 2,500,000
(Debt Capitalisation Rate is 8%)		
Total Market value of the Firm	Rs. 4,166,667	Rs. 4,642,857
Average Cost of Capital	13%	10.77%

(a) You own Rs. 11,000 worth of Bharat's equity. Show what arbitrage you would resort to.

(b) When will, according to Modigliani and Miller, this arbitrage cease?

Unit :15:
Dividend Policies

Introduction

The prime objective of a firm, is to maximize wealth of its owners i.e. shareholders. Equity shareholders make investment in the company with the surety that their capital will not be redeemed during the life time of the company. Even there is no responsibility on the part of the company to pay any yearly amount to equity holders. But the shareholders of the company make investment in the company with the hopes that they would get some return at the end of the year if the company generates any profits. This return may be in the form of dividend. Dividend means 'divide the end', if the company distributes the end results of the operation carried though out the year to its shareholders then it is known as dividend. Cash inflows are generated from the successful operation of business which are used for payment of dividends to its shareholders. Dividend paid represents a cash outflow which deplete the cash resources. The dividend decision is regarded as a financing decision since any cash dividend paid reduces the amount of cash available for investment by the firm. Dividends are periodic cash payments by the company to its shareholders. The dividend payable to the preference shareholders is usually fixed by the terms of the issue of preference shares. But the dividend on equity shares is payable at the discretion of the board of directors of the company. After generating profits there are two options available for the board of the directors to decide, first either to distribute the dividend or second to retain the profits for the purpose of making reinvestment in the business. Dividend policy decision has a significant effect on the credit standing of the firm, it s share prices and its future growth.

For payment of dividends, a company must earn distributable profits from which the actual payment of dividends will be made. Dividend policy is contemporary to retention policy. Retentions are used to finance capital projects and redeem shares and debentures. Dividends may be defined as divisible profit distributed amongst the members of a company in proportion to their shares in such a manner as is prescribed by the Memorandum and Articles of Association of the company. A dividend is a share of profit of the company divided among its shareholders.

Dividend policy is one of the most important financial policies, not only form the viewpoint of the company, but also from that of the shareholders, the consumers, the workers, regulatory bodies and the Government. For a company, it is a pivotal policy around which other financial policies rotate. Value of the corporate securities depends to a great extent on dividend and, therefore, in deciding upon the financial structure of a company, dividend has to be assigned due consideration.

Dividend decision in the corporate management is different from non-corporate entities. The corporate management is an elective management and the power of recommending dividend is vested with the board of directors. The board of directors therefore, decides the amount of dividend distributed by a company, and shareholders don't have any direct say in such a decision. The board of directors holds a fiduciary position both with regard to the company as well as shareholders. The board of directors must make interalia the three decisions pertaining to investment, financing and dividends simultaneously as these three decisions are interrelated.

Dividend policy decision influences the financing decision of the firm through retained earnings. Financing decision would relate to the amount of funds to be raised from external sources as the investment needs of a firm can be fulfilled by a combination of retained earnings and external financing. Therefore, higher the amount of retained earnings, given the investment needs, lower will be the need for external finance and vice-versa.

Structure of the Chapter:

15.1 Objectives:
15.2 Types of Dividend
15.3 Important Considerations in Dividend policy
15.4 Theories on Dividend Policies
      15.4.1 Dividend Growth Valuation Model (Gordon Growth Model)
      15.4.2 Walter's Valuation Model
      15.4.3 Modigliani and Miller – Irrelavancy Theory
      15.4.5 'Bird in Hand' Theory
15.5 Types of Dividend Policy
15.6 Exercise

15.1 Objectives:

At the end of this chapter the students will learn about –

- ❑ Types of dividend
- ❑ Factor affecting dividend policy
- ❑ Determination of dividend policy
- ❑ Theories on dividend policy

15.2 Types of Dividend

Dividend may be : (i) Interim Dividend (ii) Final Dividend

Interim Dividend:

A dividend which is declared and distributed before the company's annual earnings have been calculated; often distributed quarterly is known as interim dividend. Interim dividend is a dividend which is declared between two annual general meetings. Sometimes companies may have earned huge profits during first quarter or six months may declare interim dividend. The Board of directors may from time to time pay to the members such interim dividend as appears to it to be justified by the profits of the company. The directors must take into consideration the future prospects of the profits e.g. orders in had, any seasonal element in business before declaration of interim dividend otherwise it may be considered payment out of capital. Cash resources, like hood profitability of the company must also be taken into while deciding to declare an interim dividend.

Final Dividend:

At the end of the accounting period, the accounts of the company are prepared to ascertain the amount of profit earned by the company. The directors, taking into consideration the financial position of the company's future prospectus, provision for resources etc., decide to recommend to the shareholders at the annual general meeting the dividend to be paid to the shareholders. The dividend declared by the shareholders in the meeting should not be more than what is recommended by the board of directors but it may be less than it.

Dividend on Preference Shares –

The Articles of association of a company empower the directors to declare and pay both interim and final dividend on preference shares. Preference share holders has prefrecial rights in getting dividend against equity share holders. Holders of preference shares are entitled to receive dividend before any dividend is paid to the equity shareholders as per the terms of the issue.

15.3 Important Considerations in Dividend policy

Dividend policy determines the distribution of net cash flow generated from successful trading between dividend payment and corporate retention's. Dividend policy determines the division of earning between payments to shareholders and reinvestment in the firm.

Objectives of the study

The principal objectives of the present study are delineated below:

I. To identify the prominent variables influencing the dividend policies of the select companies.

II. To examine the extent to which these variables maintain their relative dominance over the periods under study.

Retained earnings are one of the most significant sources of funds for financing corporate growth, but dividend constitute the cash flows that accrue to shareholder. Before study of the difference theories on dividend policy understanding of the following considerations is necessary.

- **Shareholder's income-tax:**

Dividend payments to individuals are subject to personal income taxation in the year of receipts. At the time of selling the shares, the investor will be attracted with capital gain. By paying dividends, a corporation is foreign its stock holders to have to pay-taxes earlier than they would if the dividend were not paid.

- **Dividend's Attractions:** Firms with different dividend policies will appeal to different kind of investors, with cache group constituting a different dividend clientele. A dividend clientele is a group of investors favoring a particular kind of dividend policy. Low and zero tax payers appear to prefer high pay-out ratios while high taxation group prefer low dividend and expect to realize benefits through capital gains.

- **Dividend Payout ratio:** Dividend payout ratio in the dividend per share divided by the earnings per share as follows:

$$\text{Dividend payout ratio} = \frac{\text{Dividend per share}}{\text{Earnings per share}}$$

Dividend payout indicates the extent of the net profits distributed to the shareholder as dividend. A high payout signifies a liberal distribution policy and a low payout reflects conservative distribution policy.

- **Dividend Cover:** The dividend cover is calculated as follows:

$$\text{Dividend Cover} = \frac{\text{Profit after tax}}{\text{Dividend}}$$

This ratio indicates the number of times the dividend are covered by net profit. This highlights the amount retained by a company for financing of future operations.

- **Psychological effects:**

Dividend declaration is one of the most important factor influencing the price of share in the capital market. It has been observed that an increase in the dividend is often accompanied by an increase in the price of the stock, while a dividend cut generally leads to a stock price decline. The companies, in practice appear to place great emphasis on last year's dividend when deciding the current year's dividend. Dividends tend to be more stable than earnings; companies appear to pursue some long-term payout ratio and dividend are changed in line with expected future net cash flows.

Change in dividend policy may convey information to the stock market. An increase in dividends is likely to be interpret d as good news and a cut as bad news. The complete skip off of a dividend is likely to be regarded as very bad news. The companies use this information channel to inform the investor. The impact of dividend announcement on share price is shown is figure.

According to these psychological effects, dividend changes provide an infective way of allowing management to convey believable information to the market about the firm's expected future cash flows. By conveying the favorable information to the market in a believable way the dividend decision may effect the value of the firm.

- **Divisible Profit:**

All the profits of a company are not divisible. Only those profits which can be legally distributed in the form of dividend to the shareholder of the company are called as 'divisible profit' otherwise, it is treated as payment of dividend out of capital and the directors of the company are liable to make it good. Even it is necessary to transfer certain amount of profit to reserves before declaring dividend. Capital profits may only

be used for dividend where the Articles of Association of a company permit and there is a bona fide revaluation of all the assets of the company and the profit on disposal of assets are converted into cash i.e. realized.

- **Liquidity**:

While declaring dividend of the company not only the profitability of the company should be considered but also the liquidity position must also be seen because once a dividend is declared then it becomes liability on the part of the company to pay it. In order to pay dividend a company requires cash and therefore the availability of cash resources within the company will be factor in determining dividend payments. It is not necessary mean a highly profitable situation as the company with large amount of cash at its disposal. The liquidity position of the company will influence the dividend payout of a particular year.

- **Rate of expansion of business**:

A company after generating profits finds two ways either to retain it for future reinvestment in the business or distribute it among the shareholders of the business. If the company has any profitable investment opportunity which can generate the profits at a higher rate than the shareholders can earn by making investment elsewhere or employing elsewhere, then it is advisable to make reinvestment in such profitable investment opportunity and vice versa. The rate of asset expansion needs to be taken into account. The more rapid the rate at which the firm is growing the greater will be its needs for financing asset expansion. The greater the future need for funds, the more likely the firm is to retain earnings rather than pay them out. If a firm seeks to raise funds externally, natural sources are the present shareholders who already know the company, yet if earnings are paid out as dividend and are subjected to high personal income-tax rate. Only a portion of the earnings would be available for reinvestment.

- **Rate of return**:

Profit rate also influences the dividend/retention policy. The rate of return on assets determines the relative attractiveness of paying out earnings in the form of dividend to shareholders who will then invest elsewhere, compared with the productivity of their use in the present enterprise.

- **Stability of earnings**:

The stability of earnings also effects the decision. If earnings are relatively stable, a firm is better able to predict what its earnings than is a firm with fluctuating earnings. The unstable firm is not certain that in subsequent years the hopes for earnings will be realised so it is more likely to retain a high proportion of earnings. If the earnings are not stable it may be possible that in the year of high earnings more dividends are declared and vice versa which can affect the image of the company.

- **Contractual constrains**:

Usually when financial institutions or money lenders grant loans to a company they make provisions in the covenant with the company restricting the payment of dividend

to the shareholders subject to safeguarding their interest amounts. When the company obtained loan funds form debenture holders or term lending institutions, the terms of issue or contract of loan may contain restrictions on dividend payments designed to ensure that the firm will have enough funds to meet its obligations to the loan providers.

- **Cost of external financing:**

Profits of the company are useful source of finance if it is not distributed in the form of dividends. If the company distribute the profits in the form of dividend then they have to rely on the external financing for making investment in the profitable investment opportunities. The cost of external financing will have impact on the dividend payout of a company. In situations where the external funds are costlier, a firm may resort to low dividend payout and use the internal funds for financing its business.

- **Degree of control:**

The management who wish to maintain close control over the firm will not much depend on the external sources of finance and they maintain a low dividend payout policy and the funds generated from operations would be used for working capital and capital investment needs of the firm.

- **Access to Capital Market:**

A firm intends to raise further funds from the capital market for its expansion and diversification projects will have to attract the fund from the capital market and for that it has to maintain a liberal dividend policy. The investment decisions of a general investor will be influenced by the firm's dividend policies. A company declaring more dividend will attract more investors and vice versa.

- **General State of Economy:**

When state of economy is uncertain, both political and economic, the firm may maintain a low dividend payout policy to withstand to the business risks.

15.4 Theories on Dividend Policies

The important theories on Dividend Policies is discussed below:

15.4.1 Dividend Growth Valuation Model (Gordon Growth Model)

The model was put forward by Myron J. Gordon. According to him, the market value of a share is equal to the present value of dividends to be received by the shareholders. If the firm retains the earnings and does not pay dividend, the investor would get it in future. But receipt of dividend in future is uncertain both in respect of time and amount. Hence, investors prefer current dividend. Investors are rational and risk-averse, meaning thereby that do not like to take risk in respect of future dividend. Hence, the value of shares of those firm which pay higher current dividend will be higher because the investor prefers current dividend than the future dividend, as future is uncertain. The divided of most companies are expected to grow and evaluation of

value of share based on dividend growth is often used in valuation of Shares – dividend valuation model assumes contains level of growth in dividends in perpetuity. This model is known as Gordon Growth model. The formulation is given below:

$$P_E = \frac{d_0\ (1 + g)}{K_E - g}$$

Where,

P_E = Market price per share (ex-dividend)
J_0 = Current year divided
G = **Constant annual growth of dividends**
K_E = Cost of Equity Capital (Expected rate of return)

Payal products Ltd. is an established company having its shares quoted in the major stock exchanges. Its share current market price after dividend distributed at the rate of 21% p.a. having a paid up shares capital of Rs. 50 lakhs of Rs. 10 each. Annual growth rate in dividend expected is 3%. The expected rate of return on its equity capital is 16%.

Calculate the value of Payal products Ltd.'s share based on Dividend growth model.
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Dividend distributed during the year $= 50,00,000 \times \dfrac{21}{100} = $ Rs. 10,50,000

$$P = \left[\frac{d_0(1 + g)}{K_E - g}\right]$$

$$= \left[\frac{Rs.10,50,000(1 + 0.03)}{0.16 - 0.03}\right]$$

$$= \frac{Rs.10,50,000(1.03)}{0.13}$$

$$= \frac{Rs.10,81,500}{0.13} = \text{Rs. 83,19,231 say Rs. 83,20,000}$$

Value per share $= \dfrac{Rs.83,20,000}{5,00,000} = $ Rs. 16.64

Assumptions - Gordon growth model using dividend capitalization is based on the following assumption:

- Tax does not exist
- The Company has perpetual life
- Cost of Capital remains constant and is greater than growth rate
- Rate of return is constant
- Retained earnings represent the only source of financing

The implications of the model is that when the rate of return is greater than the cost of capital, the price per share increases as the dividend ratio decreases and vice versa.

The price per share remains unchanged where the rate of return and cost of capital are equal.

In fact some companies, although earning profit elect not to pay dividends. This is a matter of deliberate financial policy, not a measure forced upon them by financial difficulties. The above theory of share valuation can still be applied to these companies, since one day presumably they will start paying dividends. This is the only basis on which shareholders can obtain any returns from the company.

The reason the price of shares rises is that with retention policies of the company, the rapid growth alters investors expectations about the future size of dividends. At some time in the future, large dividends can be paid. So once again it can be said that dividends determine the company's share price.

15.4.2 Walter's Valuation Model

Prof. James E. Walter argued that the optimum dividend will be determined by the relationship of internal rate of return and the cost of capital. If the rate of return earned by firm in the business is more than cost of capital that is, the rate ate which funds are available to the firm from outside sources, the firm should retain the earnings, as it could be invested more profitably in business.. On the other hand, if the cost of capital is more than the return available on firm's investment, the firm should distribute its earning as dividend, as in that case, the shareholders receive dividend, on which they can earn a higher return by investing it elsewhere. Walter has related dividend policy with investment opportunity available to the firm. If the firm has adequate profitable opportunities of earning higher return than what the shareholders expect, it should retain its earnings. Such firm are known as growth firms and for such firm the dividend pay out ration will be nil. But if the firm does not have profitable investment opportunities then they should distribute dividend to their shareholders so they can invest it elsewhere in profitable investment opportunities. In third case it may even happen that the cost of capital of the firm equates with rate of return, in that the case the value of the firm will be not be affected with the decision regarding dividend pay out. In long-run the share prices reflect only the present value of expected dividends. Retentions of profit influence stock price only through their effect on future dividends. Walter has formulated this and used the dividend to optimise the wealth of an equity shareholder. His formula in determination of expected market price of a share is given below:

$$P = \frac{D + R_a/R_c \ (E - D)}{R_c}$$

Where

P	=	Market price of equity share
D	=	Dividend per share
E	=	Earnings per share
(E-D)	=	Retained earning per share
R_a	=	Internal rate of return on investment
R_c	=	Cost of capital

If R_a is greater than 1, lower dividend will maximise the value per share and vice versa.

Assumption – Walter's model is based on the following assumptions:

- In a company where return on investment is lower than market capitalisation rate, shareholders would prefer higher dividend so that they can utilise the funds so obtained elsewhere in more profitable opportunities.
- In a company where the rate expected by investors is higher than market capitalisation rate, shareholders would accept low dividends, and
- All earnings are either distributed as dividends or invested internally immediately.
- There is no change in the key variables such as EPS and DPS.

- The firms has an infinite life and is a going concern.

- IN view of Prof. Walter, in the long-run, the relationship between the rate of return on retained earnings or return on investment and the rate of market expectation is important to the investors. We can summarise his idea into the following:

- With additional investment undertaken. the firm's business risk does not change. It implies that firm's IRR and its cost of capital are constant.

- All financing is done through retained earnings and external sources of funds like debt or new equity capital are not used.

Thus, according to him. the investment policy of a firm cannot be separated from its dividend policy and both are inter-related. The choice of an appropriate dividend policy affects the value of an enterprise. Retentions of profits influence the share prices only through their effect on further dividends. The Walter's model implies that:

(a) The optimal payout ratio for a growth firm, is nil

(b) The optimal payout ratio for a normal firm is irrelevant.

(c) The optimal payout ratio for a declining firm, is 100%.

Walter's formula is criticized for the reason that it does not consider all the factors affecting dividend policy and share price.

Calculate the market price of Kazi Ltd.'s share under Walter's Model.

Earning per share	Rs. 4
Dividend per share	Rs. 2.50
Cost of capital	16%
Internal rate of return	18%

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Walter's formula :

$$P = \frac{D + \dfrac{R_a}{R_c}(E - D)}{R_c}$$

$$= \frac{2.50 + \dfrac{0.18}{0.16}(4 - 2.50)}{0.16} = \text{Rs. } 26.17$$

15.4.3 Modigliani and Miller – Irrelavancy Theory

Modigliani and Miller have argued that a firm's dividend policy has no effect on its value of assets. For example, if the rate of dividend declared by a company is less, its retained earnings will increase and so also the net worth and vice versa. Their argument is that the value of the firm is unaffected by dividend policy i.e., dividends are irrelevant to shareholders wealth. They built their argument on a number of assumptions the most important of which were:

- Investors and managers have the same set of information (symmetric information) regarding future opportunities.
- Dividend policy has no effect on the firm's cost of equity.
- There are no stock floatation or transaction costs.
- The firm's capital investment policy is independent of its dividend policy
- There are no personal or corporate income taxes.

The reason given by MM is that the value of the firm is determined by its basic earnings power and its risk class, and therefore, that the firm's value depend on its asset investment policy rather than on how earnings are split between dividends and retained earnings. MM demonstrated, under a particular set of assumptions, that if a firm pays higher dividends, then it must sell more stocks to new investors, and that the share of the value of the company given up to new investors is exactly equal to the dividends paid out. The value of the firm was not determined by the amount of dividends paid, but rather by the earning power of the projects in which the firm invested its money.

The argument used by MM to support this key assumption is referred to as the 'Clientele effect'. The clientele effect states that a firm will attract stockholders whose preference with respect to the payment pattern and stability of dividends corresponds to the firm's payment pattern and stability of dividends. Since the shareholders, or the clientele of the firm get what they expect the value of the firm's stock is unaffected by changes in its dividend policy.

Accordingly to M.M. Model the market price of a share after dividend declared is calculated by applying the following formula:

$$Po = \frac{P_1 + D_1}{1 + K_c}$$

Where,

P_0	=	The prevailing market price of a share
K_e	=	The cost of Equity Capital
D_1	=	Dividend to be received at the end of period one
P_1	=	Market price of a share at the end of period one

Jesus Ltd. belongs to a risk class of which the appropriate capitalization rate is 10%. It currently has 1,00,000 shares selling at Rs. 100 each. The firm is contemplating declaration of a dividend of Rs. 6 per share at the end of the current fiscal year which has just begun. Answer the following questions based on Modigliani and Miller Model and assumption of no taxes :

(i)What will be the price of the shares at the end of the year if a dividend is not declared ?

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Modigliani and Miller – Dividend Irrelevancy Model

$$P_o = \frac{P_1 + D_1}{1 + K_e}$$

Where

D_1 = Contemplated dividend per share i.e. Rs. 6
P_1 = Market price of share at the year end (to be determined)
P_0 = Existing market price of share i.e. Rs. 100
K_e = Cost of equity capital or Rate of capitalization i.e. 10% or 0.10

(ii) If dividend is declared :

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 6}{1 + 0.10}$$

$$100 = \frac{P_1 + 6}{1.10}$$

$$100 \times 1.10 = P_1 + 6$$
$$110 = P_1 + 6$$
$$P_1 = 110 - 6$$
$$P_1 = Rs.\ 104$$

(i) If dividend is not declared

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 0}{1 + 0.10}$$

$$100 = \frac{P_1}{1.10}$$

$$100 \times 1.10 = P_1$$
$$P_1 = Rs.\ 110$$

15.4.5 'Bird in Hand' Theory

Graham, Dodd and Cottle (1962) have given theory. There are two options available to the company after generating profits either to distribute it or to retain it. Investors prefer current distribution of the dividend as the future is undertain. Dividends are worth more to investors than retained earnings since it is assumed that the purchaser of a share buys with the expectations of future dividends. Their argument is that investors will apply a lower rate of discount to the expected stream of future dividends than the more distant capital gains. This argument gets support from the Gordon valuation model which places higher values on securities offering higher dividend growth

Goldon and Linter disagreed with MM, arguing that dividends are less risky than capital gain in future, so a firm should set a high dividend payout ratio and offer a high dividend yield in order to minimize its cost of capital. Investors believe that a bird in hand is better than two in the bush. Gordon view that capital gains resulting from retained earnings are less certain and hence riskier than dividends. Accordingly it is believed that the earnings of a firm with low payout ratio will be capitalized at a higher rate than will the earnings of a higher payout firm.

15.5 Types of Dividend Policy

– Constant payout Ratio Policy:

Under this policy dividend are paid at constant rate of earning, main features of the policy is as follows.
   o Very few firms select this method.
   o For most firms, earnings are quite volatile, fluctuating with change in the economy and firm's own special circumstances.
   o The dividend policy is entirely based on company's ability to pay under this policy.
   o This concept of stability of dividend means 'always paying a fixed percentage of the net earnings every year'.
   o Under this method, if earnings vary, the amount of dividends also varies from year to year.
   o The company follows a regular practice of retained earnings.
   o The dividends varies from year to year, if earnings vary.
   o This method is known as 'Constant Payout Ratio Method'.

– Constant Dividend Rate Policy:

Here under this policy the dividend will be the same year by year unless profits are widely fluctuated. The main features of the policy is as follows.
   o Firms are against cutting dividends, because of the extremely unfavourable new it conveys to the market.
   o Firms are generally careful to set the dividend at a sustainable level and raise it only when the firm can sustain the higher level.
   o Occasionally firms may cut dividends in adverse situations.

- o This policy is possible only through the maintenance of what is called 'Dividend Equalisation Reserve'. The company then invest funds equal to such reserves in some current investments so as to manage the liquidity of the necessary funds in times of need.
- o This may be possible only when the earnings pattern of the company does not show wide fluctuations.
- o It is a most popular kind of dividend policy which advocates the payment of dividend at a constant rate, even when earnings vary from year to year.

15.6 Exercise

Answer the following questions

1. What is dividend? What are the types of dividend?
2. What factors should be considered while determining dividend policy?
1. Explain Gordon's dividend growth model for share valuation?
2. Explain Walter's share valuation model with its assumptions?
3. Explain Bird in hand theory?
4. Explain the constant pay out ratio as dividend policy?

Note: Practical examples given under this chapter is for the practical understanding of the theory otherwise practical questions will not be asked from this chapter.

with a 10% premium. The corporate taxation rate is 40%. Calculate the cost of debentures.

$$Kd = \frac{[I + (Rv - Sv / N)] (1 - T)}{(Rv + Sv) / 2}$$

$$= \frac{[24 + (165 - 135)/ 10] (1 - 0.40)}{(165 - 135) / 2}$$

$$= (24 + 3) (0.60) / 150$$

$$= 16.2 / 150$$

$$= 0.108 \text{ or } 10.8\%$$

In term of equation, Cost of Debt = Coupon rate on the bonds *minus* The Tax Savings

12.6 Retained Earnings:

When the company raises funds by issuing debentures, it is required to pay interest at fixed rate, even on preference shares, it has to pay dividend at a fixed rate. But if they make the use of retained earnings, they are not supposed to pay any interest or dividend to any one. So can it be treated as cost free source of capital? No, it has some cost which is based on the assumption that had this earnings been distributed among the shareholders instead of retaining within the firm, they would have invested them somewhere else. Thus the cost of retained earnings is the return the shareholder had foregone by not investing his share of earnings elsewhere.

In we understand it as a practical illustration,
After a company makes money (earnings), who owns that money? The shareholders, right? But when you retain earnings are not given back to the shareholders. Company is keeping it. In a way, company is investing it for them in other activities. Well those shareholders want some return on that money company is keeping.. How much return do they expect? They want the same amount as if they had gotten the retained earning in the form of dividends, and bought more stock in your company with them. THAT is the cost of retained earnings.

12.7 Weighted Average Cost of Capital (WACC)

In simple terms, the WACC is the overall cost of capital for the firm considering all capital components with their respective weights in the capital mix. The argument in favour of using WACC seems from the concept that investment capital form various source should be seen as a poll of available capital for all the capital projects of an organization. Hence cost of capital should be weighted average cost of capital. Traditionally, optimal capital structures is assumed at a point where WACC is minimum. For project evaluation, this WACC is considered as the minimum rate of return required from project to pay off the expected return of the investors and as such