
UNIT 2 COST OF CAPITAL

Objectives

The objectives of this unit are to :

- provide conceptual understanding of the cost of capital and its variants.
- illustrate the computation of cost of specific courses of long-term finance viz. long term debt and debentures, preference shares, equity shares, and retained earnings.
- discuss and illustrate the various weighting approaches and the Weighted Average Cost of Capital (WACC).
- examine the utility of cost of capital

Structure

- 2.1 Introduction
- 2.2 Concept of Cost of Capital
 - 2.2.1 Components of Cost of Capital
 - 2.2.2 Classification of Cost of Capital
- 2.3 Computing Cost of Capital of Individual Components
 - 2.3.1 Cost of Long-term Debt
 - 2.3.2 Cost of Preference Capital
 - 2.3.3 Cost of Equity Capital
 - 2.3.4 Cost of Retained Earnings
- 2.4 Weighted Cost of Capital
- 2.5 Significance of Cost of Capital
- 2.6 Some misconceptions about the Cost of Capital
- 2.7 Summary
- 2.8 Keywords
- 2.9 Self Assessment Questions
- 2.10 Further Readings
- 2.11 Answers
 - Appendix 2.1: Share Valuation with Constant Growth in Dividends

2.1 INTRODUCTION

The Cost of Capital is an important financial concept. It links the company's long-term financial decisions with the shareholders' value as determined in the market place. Two basic conditions must be fulfilled so that the company's cost of capital can be used to evaluate new investment:

- 1) The new investments being considered have the same risks as the typical or average investment undertaken by the firm.
- 2) The financing policy of the firm remains unaffected by the investments that are being made.

In this unit, we shall dilate upon the concept of the cost of capital and its classification, the process of computing cost of capital of individual components, weighted cost of capital, significance of cost of capital and a few misconceptions about the cost of capital.

2.2 CONCEPT OF COST OF CAPITAL

The term cost of capital refers to the minimum rate of return that a firm must earn on its investments so as to keep the value of the enterprise intact. It represents the rate of return which the firm must pay to the suppliers of capital for use of their funds.

The following are the basic characteristics of cost of capital :

- i) Cost of Capital is really a rate of return, it is not a cost as such.
- ii) A firm's cost of capital represents minimum rate of return that will result in at least maintaining (If not increasing) the value of its equity shares.
- iii) Cost of Capital as a rate of return is calculated on the basis of actual cost of different components of capital.
- iv) It is usually related to long-term capital funds.
- v) In operational terms, Cost of Capital in terms of rate, of return is used as discount rate, used to discount the future cash inflows so as to determine their present value and compare it with investment outlay.
- vi) Cost of Capital has three components:
 - a) Return at Zero Risk Level.
 - b) Premium for Business Risk.
 - c) Premium for Financial Risk.

The cost of capital may be put in the form of the following equation:

$$K = r_0 + b + f$$

Where

- K = Cost of Capital
 r_0 = Return at zero risk level (Risk free returns)
b = Premium for business risk
f = Premium for financial risk

Thus,

- a) Cost of Capital with Business Risk > Cost of Capital with no risk; and
- b) Cost of Capital with financial risk > Cost of Capital with Business Risk > Cost of Capital with no risk.

2.2.1 Components of Cost of Capital

A firm's cost of capital comprises three components:

- **Return at Zero Risk Level :** This refers to the expected rate of return when a project involves no risk whether business or financial.
- Purchasing power risk arises due to changes in purchasing power of money.
- Money Rate Risk means the risk of an increase in future interest rates.
- Liquidity risk means the ability of a supplier of funds to sell his shares/ debentures bonds quickly.

2.2.2 Classification of Cost of Capital

Cost of Capital can be classified as follows:

- 1) **Explicit Cost and Implicit Cost :** Explicit cost is the discount rate that equate the present value of the expected incremental cash inflows with the present value of its incremental cash out flows. Thus, it is 'the rate of

return of the cash flows of financing opportunity'. In contrast, implicit cost is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the project presently under consideration by the firm were accepted. In a nutshell, explicit costs relate to raising of funds while implicit costs relate to usage of funds.

- 2) **Average Cost and Marginal Cost :** The average cost is the weighted average of the costs of each components of funds. After ascertaining costs of each source of capital, appropriate weights are assigned to each component of capital. Marginal cost of capital is the weighted average cost of new funds raised by the firm.
- 3) **Future Cost of Capital :** Future cost of capital refers to the expected cost to be incurred in raising new funds while historical cost represents cost of capital incurred in the past in procuring funds for the firms. In financial decision making future cost of capital is relatively more relevant.
- 4) **Specific Cost and Combined Cost :** The costs of individual components of capital are specific cost of capital. The combined cost of capital is the average cost of capital as it is inclusive of cost of capital from all sources. In capital budgeting decisions, combined cost of capital is used for accepting /rejecting the investment proposals.

Activity I

- 1) Define the following :

i) Explicit Cost	iii) Average Cost
ii) Cost of Capital	iv) Marginal Cost

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- 2) Discuss various types of risks associated with the concept of Cost of Capital.

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- 3) State how can Cost of Capital help a firm in converting its future cash inflows in its present value.

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2.3 COMPUTING COST OF CAPITAL OF INDIVIDUAL COMPONENTS

Computation of cost of capital from individual sources of funds helps in determining the overall cost of capital for the firm. There are four basic sources of long-term funds for a business firm:

- i) Long-term Debt and Debentures,

- ii) Preference Share Capital,
- iii) Equity Share Capital,
- iv) Retained Earnings

Though all of these sources may not be tapped by the firm for funding its activities, each firm will have some of these sources in its capital structure.

The specific cost of each source of funds is the after-tax cost of financing. The procedure for determining the costs of debt, preference and equity capital as well as retained earnings is discussed in the following sub-sections.

2.3.1 Cost of Long-Term Debt

Cost of long-term debt represents the minimum rate of return that must be earned on debt financed investments if the firm's value is to remain intact. Long-term debt may be issued at par, at premium or discount. It may be perpetual or redeemable. The technique of computation of cost in each case has been explained in the following paragraphs.

- (a) The formula for computing the Cost of Long-term debt at par is

$$K_d = (1 - T) R$$

where

$$K_d = \text{Cost of Long-Term Debt}$$

$$T = \text{Marginal Tax Rate}$$

$$R = \text{Debenture Interest Rate}$$

Example, if a company has issued 10% debentures and the tax rate is 60%, the cost of debt will be

$$(1 - .6) 10 = 4\%$$

- (b) In case the debentures are issued at premium or discount, the cost of the debt should be calculated on the basis of net proceeds realized. The formula will be as follows.

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

Where

$$K_d = \text{Cost of debt after tax}$$

$$I = \text{Annual Interest Payment}$$

$$N_p = \text{Net Proceeds of Loans}$$

$$T = \text{Tax Rate}$$

Example, a company issues 10% irredeemable debentures of Rs. 1,00,000. The company is in 60% tax bracket.

$$\begin{aligned} \text{Cost of debt at par} &= \frac{\text{Rs. } 10,000}{\text{Rs. } 1,00,000} \times (1 - .60) \\ &= 4\% \end{aligned}$$

$$\text{Cost of debt issued at } 10\% \text{ discount} = \frac{\text{Rs. } 10,000}{\text{Rs. } 90,000} \times (1 - .60)$$

$$= 4.44\%$$

$$\text{Cost of debt issued at} = \frac{\text{Rs.10,000}}{\text{Rs.1,10,000}} \times (1 - .60)$$

10% Premium

$$= 3.63\%$$

- (c) For computing cost of redeemable debt, the period of redemption is considered. The cost of long-term debt is the investor's yield to maturity adjusted by the firm's tax rate plus distribution cost. The question of yield to maturity arises only when the loan is taken either at discount or at premium. The formula for cost of debt will be

$$\frac{I + \frac{\text{Discount}}{\text{mp}} \left(\begin{array}{l} \text{In case of} \\ \text{premium} \end{array} \frac{\text{Premium}}{\text{mp}} \right)}{\frac{p + nP}{2}} \times (1 - T) \times 100$$

where

mp = maturity period

p = nominal or par value

np = net proceeds i.e. (Par value - Discount + Premium)

Example, a firm issued 1,000, 10% debentures, each of Rs. 100 at 5% discount. The debentures are to be redeemed in the beginning of 11th year. The tax rate is 50%.

$$\begin{aligned} & \frac{10,000 + \frac{5,000}{10}}{1,00,000 + 95,000} \times 100 (1 - .5) \\ & \frac{10,500}{97,500} \times 50 = 5.385\% \end{aligned}$$

- (d) In case of underwriting and other issuing costs, they are adjusted in the same way as discount is being adjusted in net proceeds and other calculations.

Example, A company raised loan by selling 2,500 debentures with 10% rate of interest at premium at Rs. 5 per debenture (Par value = Rs. 100), redeemable in the 11th year. Underwriting and other issuance costs amounted to 3% of the proceeds. The tax rate is 50%

$$= \frac{\left(25,000 - \frac{12,500}{10} + \frac{7,875}{10} \right)}{\left(\frac{2,50,000 + 2,54,25}{2} \right)} \times (1 - .5) \times 100$$

$$= \frac{25,000 - 1250 + 788}{2,52,313} \times .5 \times 100$$

$$= 4.865\%$$

- (e) Yield to maturity method of computing cost of debt capital is an approximation method. A better method is that which converts yield to maturity into a discount rate. James C. Van Horne says “ the discount rate that equates the present value of the funds received by the firm, net of underwriting and other costs with the present value of expected outflows. These outflows may be interest payments, repayment of principal or dividends”. It may symbolically be written as:

$$np = \sum_{t=1}^n \frac{\text{(cash outflows)}^t}{(1 + K)^t}$$

where

- np = net amount available for use
 (Cash outflows) = amount of interest after tax + amount of repayment of principal
 t = time period
 K = discount rate

Example, A company has issued 11% debentures for Rs. 2,00,000. The underwriting, brokerage and other issuance costs amount to Rs. 10,000. The terms of debenture issue provide for repayment of principal in 5 equal installments starting at the end of the first year. The tax rate is 60%.

$$\text{Cash inflow} = \text{Rs. } 2,00,000 - \text{Rs. } 10,000$$

$$= \text{Rs. } 1,90,000$$

Cash Outflows

Year	Installment Rs.	Interest Rs.	Total Rs.	Discount Factor	Present Value	Discount Factor	Present Value
				14%		12%	
1	40,000	22,000	62,000	.877	54374	.893	55366
2	40,000	17,600	57,600	.769	44294	.797	37875
3	40,000	12,200	53,200	.675	35910	.712	30744
4	40,000	8,800	48,800	.592	28890	.630	25175
5	40,000	4,400	44,400	.519	23044	.576	
					186512		195067

$$12\% + \frac{(195067 - 190000)}{(195067 - 186512)} (14 - 12)$$

$$12\% + \frac{5067}{8555} \times 2 = 13.184\%$$

- (f) Effective cost of debt is lower than the interest paid to the creditors because the firm can deduct interest amount from its taxable income. The higher the tax rate, the lower the effective interest rate on debt and lower the cost of debt. Let us take an example.

There are two firms, A and B. The firm A has no debt and is totally financed by equity capital. The firm B has Rs. 200 lakhs outstanding debt and pays an interest rate of 10 per cent. The firm's net income after-taxes is calculated using three tax rates, 0, 25 and 50 per cent and the resulting values of net incomes are compared. Assume that the earnings before interest and taxes of both firms is Rs. 100 lakhs each.

Tax Rates and Effective Cost of Debt
Rs. in lakhs

		0% tax rate		25% tax rate		50% tax rate	
		Firm A	Firm B	Firm A	Firm B	Firm A	Firm B
1	Earnings before-interest and taxes	100	100	100	100	100	100
2	Interest	0	20	0	20	0	20
3	Taxable income	100	80	100	80	100	80
4	Taxes	0	0	25	20	50	40
5	Net income after taxes (NIAT)	100	80	75	60	50	40
(a)	Difference	20		15		10	
(b)	Effective rate	10%		7.5%		5%	

Notes :

- a) NIAT of firm A - NIAT of firm B.
- b) (a) ÷ Rs. 200 lakhs of outstanding debt of firm B.

If no taxes were paid, the only difference between the net incomes of the two firms would be the interest expense incurred by the firm B. As the tax rate increases, this difference diminishes. In the case of 0% tax rate, we can say that the effective rate of debt is 10% (Rs. 20 / Rs. 200). In the case of 25% and 50% it is 7.5% and 5%, respectively.

A simple formula for computing the cost of debt may be stated as follows:

Effective cost of debt

$$= \text{Interest rate} \times (1.0 - \text{tax rates})$$

Substituting the data from the above example.

- 1) Effective cost of debt at 0% tax rate
 $= 10\% \times (1.0 - 0.00)$
 $= 10\%$
- 2) Effective cost of debt at 25% tax rate
 $= 10\% \times (1.0 - 0.25)$
 $= 7.5\%$
- 4) Effective cost of debt at 50% tax rate
 $= 10\% \times (1.0 - 0.50)$
 $= 5\%$

A more generalised way of calculating the cost of debt capital is to find out the discount rate which equates the present value of post tax interest and principal repayments with the net proceeds of the debt issue i.e. (Par value x no. of bonds – Issue floatation cost). Mathematically this relationship can be expressed as follows:

$$NP = \sum_{t=1}^n \frac{I(1-T)}{(1+K)^t} + \frac{R}{(1+k)^n} +$$

Where : np = net amount realised on debt issue

I = Annual interest payment

T = Tax rate applicable

R = Redemption Value

n = Maturity period of debt.

In the above eq. solving for K would yield the cost of debt capital. For solving the above equation an approximation can be used which yield fairly close value.

$$K \cong \frac{I(1-T) + \frac{(R-NP)}{n}}{(R+NP)/2}$$

Amortisation of the Cost of issue: Since the issue floatation cost is tax deductible cost and can be amortised evenly over the duration of debt finance, the cost of debt capital would be K in the following equation.

$$NP = \sum_{t=1}^n \frac{I(1-T) - \frac{(R-NP)}{n}}{(1+K)^t} + \frac{R}{(1+k)^n}$$

An approximation for K is as follows

$$K \cong \frac{I(1-T) + \frac{(R-P)}{n}(1-T)}{(R+P)/2}$$

Activity 2

1. A firm intends to issue 1,000, 10% debentures each of Rs. 100. What is the cost of debt if the firm desires to sell at 5% premium. The tax rate is 50%.

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2. A firm issues 1,000, 10% debentures of Rs. 100 each at a premium of 5% with a maturity period of 10 years. The tax rate is 50%. Find the cost of capital.

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3. A company raises loan of Rs. 2,50,000 by 10% debentures at 5% discount for a period of ten years, underwriting costs are 3% and tax rate is 50%.

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2.3.2 Cost of Preference Capital

Cost of preference share capital represents the rate of return that must be earned on preferred stocks financed investments to keep the earnings available to residual stockholders unchanged. Cost of preference shares can be estimated by dividing the dividend stipulated per share by the current market price of the share.

$$\text{Cost of Preference Capital} = \frac{\text{Dividend}}{\text{Face Value} - \text{Issue Cost}}$$

Example, A Company is planning to issue 9% preference shares expected to sell at Rs. 85 par value. The costs of issuing and selling the shares are expected to be Rs. 3 per share.

The first step in finding out the cost of the preference capital is to determine the rupee amount of preference capital is to determine the rupee amount of preference dividends, which are stated as 9% of the share of Rs. 85 par value. Thus 9% of Rs. 85 is Rs. 7.65. After deducting the floatation costs, the net proceeds are Rs. 82 per share.

Thus, the cost of preference capital :

$$\begin{aligned} &= \frac{\text{Dividend per share}}{\text{Net proceeds after selling}} \\ &= \frac{\text{Rs. 7.65}}{\text{Rs. 82}} = 9.33\% \end{aligned}$$

Now, the companies can issue only redeemable preference shares. Cost of capital for such shares is that discount rate which equates the funds available from the issue of preference shares with the present values of all dividends and repayment of preference share capital. This present value method for cost of preference share capital is similar to that used for cost of debt capital; the only difference is that in place of 'interest', stated dividend on preferences share is used. The cost of preference capital which is redeemable is the value of KP in the following equation

$$\begin{aligned} NP &= \sum_{t=1}^n \frac{D}{(1+KP)^t} + \frac{R}{(1+KP)^n} \\ KP &\cong \frac{D + (R - NP) / N}{(R + NP) / 2} \end{aligned}$$

2.3.3 Cost of Equity Capital

“Cost of equity capital is the cost of the estimated stream of net capital outlays desired from equity sources” E.W. Walker.

According to James C. Van Horne, cost of equity capital can be thought of as the rate of discount that equates the present value of all expected future dividends per share, as perceived by investors at the margin as in the current market price per share.

In a nutshell, it is the discount rate which equates present value of all expected dividends in future with net proceeds per share/current market price. It represents the minimum rate of return that must be earned on new equity stock financed investment in order to keep the earnings available to the existing residual owners of the firms unchanged.

Cost of equity capital is by far the most difficult to measure because of the following reasons:

- i) The cost of equity is not the out of pocket cost of using equity capital.
- ii) The cost of equity is based upon the stream of future dividends as expected by shareholders (very difficult to estimate).
- iii) The relationship between market price with earnings is known. Dividends also affect the market value (which one is to be considered).

The following are the approaches to computation of cost of equity capital:

- (a) **E/P Ratio Method** : Cost of equity capital is measured by earning price ratio. Symbolically,

$$\frac{E_o \text{ (current earnings per share)}}{P_o \text{ (current market price per share)}} \times 100$$

The limitation of this method are:

- Earnings do not represent real expectations of shareholders.
- Earnings per share is not constant.
- Which earnings-current earnings or average earnings (Not clear).

The method is useful in the following circumstance:

- The firm does not have debt capital.
 - All the earnings are paid to the shareholders.
 - There is no growth in earnings.
- (b) **E/P Ratio + Growth Rate Method** : This method considers growth in earnings. A period of 3 years is usually being taken into account for growth. The formula will be as follows.

$$\frac{E_o (1+b)^3}{P_o}$$

Where $(1+b)^3$ = Growth factor, where b is the growth rate as a percentage and estimated for a period of three years.

Example, A firm has Rs. 5 EPS with 10% growth rate of earnings over a period of 3 years. The current market price of equity share is Rs. 50.

$$\begin{aligned} & \frac{\text{Rs.}5 (1+.10)^3}{\text{Rs.}50} \times 100 \\ & \frac{\text{Rs.}5(1.331)}{50} \times 100 = \frac{6.665}{50} \times 100 \\ & = 13.31\% \end{aligned}$$

- (c) **D/P Ratio Method** : Cost of equity capital is measured by dividends price ratio. Symbolically,

$$\frac{D_o \text{ (Dividend per share)}}{P_o \text{ (Market price per share)}} \times 100$$

Example, the market price of equity share is Rs. 15 and dividend rate is 15% (Par value Rs. 10 per share)

$$\frac{\text{Rs. 1.5}}{\text{Rs. 15}} \times 100 = 10\%$$

The following are the assumptions

- i) The risk remains the unchanged.
- ii) The investors give importance to dividend.
- iii) The investors purchase the shares at par value.

Under this method, the future dividend streams of a firm, as expected by the investors, are estimated. The current price of the share is used to determine shareholder's expected rate of return. Thus, if K is the risk-adjusted rate of return expected by investors, the present value of future dividends, discounted by Ke would be equal to the price of the share. Thus,

$$P = \frac{D1}{(1+Ke)^1} + \frac{D2}{(1+Ke)^2} + \frac{D3}{(1+Ke)^3} + \frac{Dn}{(1+Ke)^n}$$

where,

- P = price of the share
- D1...Dn = dividends in periods 1,2,3,...n,
- Ke = the risk adjusted rate of return expected by equity investors.

Given the current price P and values for future dividends 'Dt', one can calculate Ke by using IRR procedure. If the firm has maintained some regular pattern of dividends in the past, it is not unreasonable to expect that the same pattern will prevail in future. If a firm is paying a dividend of 20% on a share with a par value of Rs. 10 as a level perpetual dividend, and its market price is Rs. 20, then

$$P = \frac{D}{Ke}$$

$$20 = \frac{2}{Ke}$$

$$Ke = \frac{2}{20} = 10\%$$

(d) **D/P + Growth Rate Method** : The method is comparatively more realistic as

- i) it considers future growth in dividends,
- ii) it considers the capital appreciation.

This method is based on the assumption that the value of a share is the present value of all anticipated dividends, which it will give over an infinite time horizon. The firm is here viewed as a going concern with an infinite life.

Thus,

$$Po = \frac{D1}{Ke - g} \text{ or } Ke = \frac{D1}{Po} + g$$

Where,

- Po = current price of the equity share
- D1 = per share dividend expected at the end of year 1
- Ke = risk adjusted rate of return expected on equity shares.
- g = constant annual rate of growth in dividends and earnings.

The derivation of the formula has been given in Appendix 2.1.

The equation indicates that the cost of equity share can be found by dividing the dividend expected at the end of the year 1 by the current price of the share and adding the expected growth rate.

Example, Raj Textiles Ltd. Wishes to determine its cost of equity capital, K_e . The prevailing market price of the share is Rs. 50 per share. The firm expects to pay a dividend of Rs. 4 at the end of the coming year 1998. The dividends paid on the equity shares over the past six years are as follows:

Year	Dividend (Rs.)
1997	3.80
1996	3.62
1995	3.47
1994	3.33
1993	3.12
1992	2.97

The firm maintained a fixed dividend payout from 1986 onwards. The annual growth rate of dividends, g , is approximately 5 per cent. Substituting the data in the formula,

$$\begin{aligned} \text{Rs. } 50 &= \frac{\text{Rs.4}}{K_e - 0.05} \\ K_e &= \frac{\text{Rs.4}}{\text{Rs.50}} + 0.05 \\ &= 0.80 + 0.05 = 13\% \end{aligned}$$

The 13% cost of equity share represents the return expected by existing shareholders on their investment so that they should not disinvest in the share of Raj Textiles Ltd. And invest elsewhere.

- (e) **Realised Yield Method** : One of the difficulties in using D/P Ratio and E/P Ratio for finding out K_e is to estimate the rate of expected return. Hence, this method depends on the rate of return actually earned by the shareholders. The most recent five to ten years are taken and the rate of return is calculated for the investor who purchased the shares at the beginning of the study period, held it to the present and sold it at the current prices. This is also the realized yield by the investor. This yield is supposed to indicate the cost of equity share on the assumption that the investor earns what he expects to earn. The limiting factors to the usefulness of this method are the additional conditions that the investors expectation do not undergo change during the study period, no significant change in the level of dividend rates occurs, and the attitudes of the investors towards the risk remain the same. As these conditions are rarely fulfilled, the yield method has limited utility. In addition, the yield often differs depending on the time period chosen.
- (f) **Security's Beta Method** : An investor is concerned with the risk of his entire portfolio, and that the relevant risk of a particular security is the effect that the security has on the entire portfolio. By "diversified portfolio" we mean that each investor's portfolio is representative of the market as a whole and that the portfolio Beta is 1.0. A security's Beta indicates how closely the security's returns move with from a diversified portfolio. A Beta of 1.0 for a given security means that, if the total value of securities in the market moves up by 10 per cent, the stock's price will also move up, on the average by the 10 per cent. If security has a beta

of 2.0, its price will, on the whole, rise or fall by 20 per cent when the market rises or falls by 10 per cent. A share with -0.5 beta will rise by 10 per cent, when the market drops by 20 per cent.

A beta of any portfolio of securities is the weighted average of the betas of the securities, where the weights represent the proportions of investments in each security. Adding a high beta (beta greater than 1.0) security to a diversified portfolio increases the portfolio's risk, and adding a low beta (beta less than zero) security to a diversified security reduces the portfolio's risk.

How is beta determined? the beta co-efficient for a security (or asset) can be found by examining security's historical returns relative to the returns of the market. Since, it is not feasible to take all securities, a sample of securities is used. In United States, such compilation of beta co-efficient is provided by companies, such as Value Line or Merrill Lynch. The Capital Asset Pricing Model (CAPM) uses these beta co-efficients to estimate the required rate of returns on the securities. The CAPM specifies that the required rate on the share depends upon its beta. The relationship is:

$$K_e = \text{riskless rate} + \text{risk premium} \times \text{beta}$$

Where, K_e = expected rate of return.

The current rate on government securities can be used as a riskless rate. The difference between the long-run average rate of returns between shares and government securities may represent the risk premium. During 1926-1981, this was estimated in USA to be 6 per cent. Beta co-efficients are provided by published data or can be independently estimated.

The beta for Pan Am's stock was estimated by Value Line to be 0.95 in 1984. Long-term government bond rates were about 12 per cent in November 1984. Thus the required rate of return on Pan Am's stock in November 1984 was:

$$\text{Required Rate} = 12\% + 6\% \times 0.95 = 17.7\%$$

The use of beta to measure the cost of equity capital is definitely a better approach. The major reason is that the method incorporates risk analysis, which other methods do not. However, its application remains limited perhaps because it is tedious to calculate Beta value. Nevertheless, as the competition intensifies and the availability of funds and their cost become a challenge, finance managers will need this or similar approaches.

Activity 3

1. A firm has Rs. 3 EPS and 10% growth rate of earnings over a period of 3 years. The current market price of equity share is Rs. 100. Compute the cost of equity capital.

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2. The current dividend paid by the company is Rs. 5 per share, the market price of the equity share is Rs. 100 and the growth rate of dividend is expected to remain constant at 10%. Find out the cost of capital.

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3. A firm issues 8% non-redeemable preference shares of Rs. 10 each for Rs. 1,00,000, underwriting costs are 6% of the sale price. Compute the cost of capital if shares are issued at discount of 2.5 percent and the premium of 5%.

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2.3.4 Cost of Retained Earnings:

Corporate managers and some analysts normally consider the funds retained in the firm as cost free funds because it does not cost anything to the firm to make use of a part of its earnings not distributed to the shareholders. However, this is not true. It definitely cost the shareholders something and this is an opportunity cost representing sacrifice of the dividend income which the shareholders would have otherwise received it and invested the same elsewhere to earn a return thereon. Thus, the minimum cost of retained earnings is the cost of equity capital (Ke).

Ezra Solomon suggested the concept of external yield to measure cost of retained earnings.

Algebraically, the approach can be explained as:

$$\left(\frac{d1}{P0} + G \right) (1 - TR)(1 - B)$$

$$= Ke (1 - TR) (1 - B)$$

where

- Ke = Cost of equity capital based on dividend growth method
- TR = Shareholders' Tax Rate
- B = Percentage Brokerage cost

Example

A firm's cost of equity capital is 12% and Tax rate of majority of shareholders is 30%. Brokerage is 3%.

$$= 12\% (1 - 0.30) (1 - 0.03)$$

$$= 8.15\%$$

2.4 WEIGHTED COST OF CAPITAL

Weighted cost of capital, also known as composite cost of capital, overall cost of capital or weighted marginal cost of capital, is the average of the costs of each sources of funds employed by the firm, properly weighted by the proportion they hold in the capital structure of the firm.

2.4.1 Choice of Weights

The weights to be employed can be book values, market values, historic or target. Book value weights are based on the accounting values to assess the proportion of each type of fund in the firm’s capital structure. Market value weights measure the proportion of each type of financing at its market value. Market value weights are preferred because they approximate the current value of various instruments of raising funds employed by the company.

Historic weights can be book or market weights based on actual data. Such weights, however, would represent actual rather than desired proportions of various types of capital in the capital structure. Target weights, which can also be based on book or market values, reflect the desired capital structure proportions. In the firm’s historic capital structure is not much different from ‘optimal’ or desired capital structure, the cost of capital is both the cases is mostly similar. However, from a strictly theoretical point of view, the target market value weighting scheme should be preferred.

Marginal weights are determined on the basis of financing mix in additional new capital to raised for investments. The new capital raised will be the marginal capital. The propositions of new capital raised will be the marginal weights.

Activity 4

1) How is the cost of retained earnings computed?

.....

2) List out three types of weights which may be used for computing weighted average cost of capital of the firm.

.....

2.4.2 Computation of The Weighted Cost of Capital

Example

A firm has the following capital structure and after tax costs for the different sources of funds used:

Source of Funds	Amount Rs.	Proportion %	After tax cost %
Debt	20,00,000	20	4.50
Preference Shares	10,00,000	10	9.00
Equity Shares	30,00,000	30	11.00
Retained Earnings	40,00,000	40	10.00
	1,00,00,000	100	

On the basis of book value, the cost of equity capital will be calculated as follows:

Method of Funds	Proportion%	Cost %	Weighted cost %
Debt	20	4.50	0.90
Preference Shares	10	9.00	0.90
Equity Shares	30	11.00	3.30
Retained Earnings	40	10.00	4.00
			9.10%

Example 2: Quality products is a consumer products company with well-established brand names. The cost of capital of quality products is estimated at the end of 1996 for use in evaluating investment proposals in 1997. The data for Quality Products Ltd. are as follows:

Financial data for Quality Products Ltd.

Rs. '0000

Source	Book Value Rs.	Market Value Rs.	Current Interest rate %
Debentures (7 $\frac{1}{2}$ %)	45	29	13.2
Debentures (9 $\frac{1}{2}$ %)	50	42	13.2
Debentures (14%)	75	78	13.2
Other debt	210	192	13.2
Total debt	380	341	13.2
Preference shares (7%)	20	10	14.0
Equity shares	720	824	

Equity Share Data Years

	1991	1992	1993	1994	1995	1996
Dividend per share	1.45	1.60	1.77	2.05	2.28	2.48
Earnings per share	2.97	3.73	4.21	4.83	4.86	4.95
Price per share	24.00					50.000

Explanatory Notes

- Interest rates on the three debentures issues were set at the rate (13.2%) on the recently issued debentures of the firm which is selling close to par. This was considered to be the best estimate.
- Other debt includes different types of loans from financial institutions and other privately placed debentures.
- Market value is based on interest rates provided in the firm's annual report.
- Preference share is Rs. 100 par: current market price is Rs. 50 per share.

Since the firm's dividend and earnings have been growing steadily since, 1991, the constant growth model can be used to estimate cost of equity. Though dividends have grown at a slightly higher rate than earnings, one may assume that shareholders would expect them to grow at the same earnings (10.8%). Also assume, on the basis of the past record that the shareholders expect a dividend of Rs. 2.60 in 1997. Thus:

$$K_e = \frac{D}{P} + g$$

$$= \frac{\text{Rs. 2.60}}{\text{Rs. 50}} + 0.108$$

$$= 16\%$$

If the investors expect the dividends to grow at the higher rate (11.3%), the cost of equity capital works out to 16.5%.

Applying the beta method, we obtain a somewhat higher number. Beta for Quality Products is assumed to be 0.85. Interest rate on government bonds (riskless rate) in 1996 would be, say, 12 per cent. The market risk premium is 6%.

Thus

$$K_e = \text{Riskless rate} + \text{Risk premium} \times \text{beta}$$

$$= 12\% + 6\% \times 0.85$$

$$= 17.1\%$$

Thus, the cost of capital for Quality Products Ltd:

	Amount Rs.	Weight	Cost	Weight x Cost
Debt	341	0.29	7.1	2.1
Preference Shares	10	0.01	14.0	0.1
Equity Shares	824	0.70	17.0	11.9
Total	1175	1.00	17.0	14.9

Weighted Average Cost of Capital : 14.1%

Explanation

- Market values of debt, preference and equity shares are used.
- Current interest rate on debt is adjusted for tax rate of 46 per cent, which is the firm’s effective rate 13.2% (1-0.46) = 7.1%
- Current preference dividend rate of 14% is used.

Activity 5

- 1) Compare Beta value of equity shares of any one company listed on Indian stock exchanges and list out the problems you faced in this regard.

- 2) Compute overall cost of capital of an Indian company of your choice. List out the steps you took for this purpose and the problems faced by you.

- 3) Try to know from the Finance Manager of an Indian Company:
- i) Do they compute the overall cost of capital of their company?
.....
.....
.....
.....
 - ii) For what purpose?
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.....
.....
.....
 - iii) If not, why not?
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.....
.....
.....

2.5 SIGNIFICANCE OF COST OF CAPITAL

The determination of the firm's cost of capital is important because

- i) Cost of capital provides the very basis for financial appraisal of new capital expenditure proposals and thus serves as acceptance criterion for capital expenditure projects.
- ii) Cost of capital helps the managers in determining the optimal capital structure of the firm.
- iii) Cost of capital serves as the basis for evaluating the financial performance of top management.
- iv) Cost of capital also helps in formulating dividend policy and working capital policy
- v) Cost of capital can serve as capitalization rate which can be used to determine capitalization of a new firm.

Activity 6

- 1) List three uses of Cost of Capital.
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.....
.....
.....
- 2) What is Weighted Average Cost of Capital?
.....
.....
.....
.....

3) The following details are available:	
Equity (Expected Dividend 12%)	Rs. 10,00,000
Tax Rate	50%
10% Preference	Rs. 5,00,000
8% Loan	Rs. 15,00,000

You are required to calculate Weighted Average Cost of Capital.

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2.6 SOME MISCONCEPTIONS ABOUT COST OF CAPITAL

The cost of capital is a central concept in financial management linking the investment and financing decisions. A few misconceptions in this regard are as follows:

- i) The concept of cost of capital is academic and impractical
- ii) It is equal to the dividend rate.
- iii) Retained earnings are either cost free or cost significantly less than external equity.
- iv) Depreciation has no cost.
- v) The cost of capital can be defined in terms of an accounting based manner.
- vi) If a project is heavily financed by debt, its weighted average cost of capital is low.

2.7 SUMMARY

The cost of capital of a firm is mainly used to evaluate investment projects. It represents minimum acceptable rate of return on new investments. The basic factors underlying the cost of capital for a firm are the degree of risk associated with the firm, the taxes it must pay, and the supply of and demand of various types of financing.

In estimating the cost of capital, it is assumed that, (1) the firms are acquiring assets which do not change their business risk, and (2) these acquisitions are financed in such a way as to leave the financial risk unchanged. In order to estimate the cost of capital, we must estimate rates of return required by investors in the firm's securities, including borrowings, and average those rates according to the market values of the various securities currently outstanding.

While the cost of debt and preference capital is the contractual interest/dividend rate (adjusted for taxes), the cost of equity capital is difficult to estimate. Broadly, there are six approaches to estimate the cost of equity, namely, the E/P method, E/P + Growth method, D/P method, D/P + Growth method, Realised yield method and using the Beta co-efficient of the share. Weighted cost of capital is computed by assigning book weights or market weight.

2.8 KEY WORDS

Cost of Capital is the minimum rate of return that must be earned on investment to maintain the value of firm.

Marginal Weights are determined on the basis of financing mix of additional capital.

Cost of Equity Capital is the discount rate which equates present value of all expected dividends in future with net proceeds per share / current market price.

Business Risk is a possibility and the firm will not be able to operate successfully in the market.

Financial Risk is the possibility that the firm will not earn sufficient profits to make payment of interest on loans and/or to pay dividends.

2.9 SELF-ASSESSMENT QUESTIONS/EXERCISES

- 1) Why is the cost of capital considered as the minimum acceptable rate of return on an investment?
- 2) In using the cost of capital to evaluate investment projects, why is it necessary to assume that the acceptance of projects and the financing structure would not attract the business and financial risks?
- 3) How is the Cost of Debt Capital ascertained? Give examples.
- 4) You have just been communicated, “since we are going to finance this project with debt, its required rate of return should only be the cost of debt”. Do you agree or disagree? Explain.
- 5) How will you calculate the Cost of Preference Share Capital?
- 6) Which method of calculating the cost of equity shares would be most appropriate for the following firms:
 - a) A profitable firm that has never paid a dividend, but has had steady growth in earnings.
 - b) An electricity company that has paid a dividend every year for the last eighty years.
 - c) A firm that has grown very rapidly until two years ago, when capacity problems in the industry produced severe price cutting in the firm’s major product line. At the same time management decided to invest heavily in facilities to manufacture a new product. So far, the manufacturing process has not worked properly. The firm lost Rs. 5 crores last year, and the price of its equity share has dropped by 20 per cent.
- 7) How would you find the cost of capital for proprietorship or partnership firm? Can you think of any ways to do this? List them.
- 8) “Retained earnings are cost free” comment.
- 9) Discuss various uses of the concept of Cost of Capital.
- 10) Determine the cost of capital for the following securities. These are issued by different firms and the tax rate is 40 per cent.

- a) A seven-year debenture with a coupon interest of 10 per cent. The debentures matures in five years and has a current market price of Rs. 90 as against its par value of Rs. 100.
- b) A preference share pays 7 per cent dividend. Par value is Rs. 100 per share and its current market price is Rs. 80.
- c) The historical average rate of return earned by equity shareholders of the firm C has been about 17% per year until very recently. The dividends of the firm have grown at an average rate of 13% per year over the same period. The financial Express and another financial fortnightly have issued a report indicating the problems of the firm with government's regulatory agencies and forecasted that dividends and earnings of the firm will grow at no more than the overall growth rate of the economy which is 5 per cent. The dividends are likely to be Rs. per share. The price of the firm's share adversely reacted to the report dropping from Rs. 100 to Rs. 50.

2.10 FURTHER READINGS

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2.11 ANSWERS

Activity 2

- i) 4.76% ii) 4.64% iii) 5.62%

Activity 3

- i) 3.99 ii) 15% iii) 8.11% and 8.73%

Activity 6

- iii) 7.67%

Appendix 2.1: Share Valuation with Constant Growth in Dividends

Assuming so the most recent dividend, and that g is the growth rate in dividend

$$P_0 = \frac{D_0 (1+g)^1}{(1+K_e)^1} + \frac{D_0 (1+g)^2}{(1+K_e)^2} + \frac{D_0(1+g)^a}{(1+K_e)^a} \dots\dots\dots (1)$$

Multiplying each side of the equation by $(1+K_e)/(1+g)$ and subtracting the resulting equation from (1),

$$\frac{P_0 (1+K_e)}{1+g} - P_0 = D_0 - \frac{D_0(1+g)^a}{(1+K_e)^a} \dots\dots\dots(2)$$

As K_e is assumed to be greater than g , the second term on the right hand side of (2) is zero, Thus

$$P_0 \left(\frac{1+K_e}{1+g} - 1 \right) = D_0 \dots\dots\dots(3)$$

$$P_0 (K_e - g) = D_0 (1 + g)$$

$$P_0 = \frac{D_1}{K_e - g} \dots\dots\dots(4)$$

- **Premium for Financial Risk :** It refers to the risk arising out of pattern of capitalization. In general, it may be said that a firm having a higher debt content in its capital structure is more risky as compared to a firm which has a comparatively low debt content.

Besides financial risk and business risk, the following risks also affect the cost of capital;

- **Premium for Business Risk :** Business risk is the possibility that the firm will not be able to operate successfully in the market. Greater the business risk, the higher will be the cost of capital. It is generally determined by the capital budgeting decisions.