UNIT VII COST OF CAPITAL

7.1 INTRODUCTION

In the previous block you learnt about concept, importance and relevance of financial management. You also learnt about the various sources of Long Term and Short Term Finance available for a company or a firm. However, raising funds from these sources attract some cost to the company. This cost is the rate of return that the company has to pay to the providers of funds. However, computational method for calculating cost for each source is different as different kind of investments carries different level of risk. But, calculating cost of each source of capital is important for a company as this cost of capital is required for capital budgeting and capital structure decisions. You will be able to assess relevance of this cost of capital for these decisions in subsequent units. The company's cost of capital can be measured by calculating specific cost which is financial payment that company incurs due to the use of specific cost of capital. Accordingly, in this unit, concept of cost of capital, methods for computing specific cost of capital and weighted average cost of capital are being explained.

7.2 UNIT OBJECTIVES

After reading this unit you will be able to;

- Calculate Cost of Debt.
- find Cost of Equity , Preference Shares and Retained Earning.
- learn the concept of weighted average cost of capital.

7.3 CONCEPT OF COST OF CAPITAL

The cost of capital is the minimum rate of return that is expected by the company to earn to meet the expectations of the equity shareholders or various categories of investors. The various sources of funds through which company raises funds are equity shares, debentures, term loans, bonds, retained earnings etc. The method for calculating cost for each source is different as different kind of investments carries different level of risk. This cost is the rate of return that needs to be offered to the fund providers in order to attract funds from them. The weighted arithmetic mean of the cost of various components of funds that a firm utilises is termed as cost of capital. It is also termed as hurdle rate or cut off rate, target rate, standard return etc. It is important for you to learn computation and importance of cost of capital as it is important for financial decision making. It is useful for providing a platform for evaluating the investment decisions as well for structuring debt-equity mix. Organizations use cost of capital to decide whether a capital project is worth to invest or not. Investors refer cost of capital to assess if an investment is worth the risk relative to the return or not. Therefore, cost of capital should be calculated on the actual basis for the specific components of cost of capital.

Let us know more about the cost of capital from the following definitions;

"Cost of capital is the minimum required rate of earnings or the cut-off rate of capital expenditures." —Solomon Ezra

"A cut-off rate for the allocation of capital to investments of projects. It is the rate of return

on a project that will leave unchanged the market price of the stock." —James C. Van Horne

"The rate of return the firm requires, from investment in order to increase the value of the firm in the market place." —Hampton, John J

"Cost of raising funds is the minimum required rate of return of the firm i.e., the cost of capital is the minimum return which the firm must earn on the proposals in order to break even."- Rustagi R.P

Thus, as defined above, we can say, that cost of capital is the minimum rate of return that a firm should get so that it can maintain its market value of the shares and thereafter be able to maintain value of a firm. This discount rate is the opportunity cost the company incurs by investing in a project instead of investing in some other alternative having similar-risk investment. It basically it is minimum rate of return which is comprised of business risk and financial risk. Therefore, there are broadly two elements of cost of capital these are, a risk-

free rate of interest and a risk premium, which is the compensation an investor would receive for a perceived risk level. Business risk refers to the changes in EBIT due to changes in sale revenues whereas financial risk refers to the risk associated with the capital structure of financial plan of a business. Financial risk of a company shall be higher if the proportion of fixed cost bearings securities is higher in the capital structure. In such case, investor expects to be compensated for this increased risk level. In view of the above, the cost of capital may be calculated as;

K= R_f +Business Risk Premium+ Financial risk premium

Rf being risk free rate

However, the measurement of a cost of capital does not have an exact procedure as it mainly depend on forecasting and estimation. Therefore, cost of capital so computed can be considered as just approximation of cost of capital. Accordingly, some practitioners consider cost of capital mere as an academic term.

7.3.1 IMPORTANCE OF COST OF CAPITAL

Cost of capital is required for financial decision making particularly for capital budgeting decisions as well as for capital structure planning and decision making. The cost of capital shall serve as a standard for the evaluation of Investment Decisions, for finalizing debt policy and for assessing the financial performance of the company.

Calculation of cost of capital is significant because of the following reasons;

1. **Evaluation of Investment decisions-** The cost of capital serves as a basis for comparing various investment alternatives. Cost of capital is used for discounting cash inflows that are used for evaluating the profitability of the Investment Proposals. In this context, overall cost of capital serves as hurdle rate as the acceptance criterion for the investment decision under the circumstances where current projects of the firm are of similar risk and investment proposals are of same character .(Van Horne).
2. **Designing Debt-Equity mix of the Company-** Cost of capital serves as one of the basis for designing sound capital structure of the company. Capital structure decisions include deciding the proportion of debt and equity in the capital structure which can maximize the value of firm and can minimize the overall cost of capital. The proportion of debt in the capital structure is significantly influenced by overall cost of capital as interest payable on debt is tax deductible. This interest tax shield reduces overall cost of capital and hence increases earning per share of the company. The company can choose the most economical sources of finance after comparing cost of various sources of financing with the expected returns. Accordingly, this will help in devising sound capital structure for a company.

3. **Evaluating Financial Performance of the Company**-The cost of capital serves as one of the standard or benchmark for evaluating financial performance of the concern. Such assessment involves comparison of actual profitability of the concern with the overall cost of capital. Company should yield higher returns than the company's cost of capital. Further, on the basis of this assessment company takes decision regarding dividend distribution and working capital management.

For calculating overall cost of capital, first you need to learn computation of cost of specific source of finance and then weighted average cost of capital. The procedure for calculating Individual Cost of Capital is discussed in the following sections;

7.4 COST OF DEBT

The Company can raise Debt in various ways say by raising funds from debentures, bonds, borrowing funds from banks and financial institutions, etc. Now, this debt can be issued at par, at premium and at a discount. Generally, amount paid as interest on debentures are generally fixed and after payment of such interest the remaining amount is distributed among equity shareholders. Hence with the advantage of using fixed charges in the capital structure, earnings available for equity shareholders can be magnified due tax shield.

Note- Dividends payable to equity and preference share holders is an appropriation of Profit and interest payable on debentures, loans etc is the charge against profit and hence is considered as an expense.

7.4.1 COST OF IRREDEEMABLE DEBT/PERPETUAL DEBT

The cost of debt is equal to the interest rate if the debenture is given at the same rate and without tax being taken into account. It provides long term funds to the company or in other words it is permanent source of raising funds. The interest rate on debt is assessed a representation of cost of debt in approximate terms. The debentures can be issued at par/face value or at discount or at premium.

Debt issued at Par

Debt issued at par is assessed as the explicit interest rate from which tax liability of a firm is deducted. Since interests paid on debentures, loans etc. are treated as expenses hence it is deducted from Earning before Interest and Taxes. Therefore, to calculate cost of debt, tax is deducted from the 'Cost of Debt before Taxes' to arrive the final figure. The following formula is used to compute the Cost of Debt before taxes;

$$k_{d_{Before\ Taxes}} = \frac{Interest}{Principal\ or\ face\ value}$$

To find out Cost of Debt after taxes (1-T) is deducted from the $k_d(Before\ Taxes)$.

$k_{d_{After\ Taxes}} = k_{d_{Before\ Taxes}}$(1-T)

T being Tax Rate

Debt issued at Discount or Premium

When Debentures are issued at Discount or Premium then in such case you have to calculate Net proceeds realized after issuing debentures for calculating cost of debt. Further if some brokerage, commissions legal fees, accounting fees or some other flotation expenses or cost of underwriting the debenture incurred while issuing debt then the same shall be deducted from principal to find out actual Net proceeds of issue of debentures or bonds.

$k_{d_{Before\ Taxes}} = \frac{Interest}{NP}$

NP Net proceeds of issue of debentures, bonds, term loans etc.

Illustration 1 Samridhi Limited has issued 10,000 10% irredeemable debentures of Rs. 100 each. The company is in 30% tax bracket. Calculate cost of debt capital at par, at 5% discount and at 10% premium.

a) At Par

$k_{d_{Before\ Taxes}} = \frac{Interest}{Net\ Proceeds} \times 100$

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

=10%

$k_{d_{After\ Taxes}} = k_{d_{Before\ Taxes}}$(1-t)

$k_{d_{After\ Taxes}}$ = 10(1-.30)=7%

b) At Discount

$= \frac{10}{95} \times 100$

=10.52%

$k_{d_{After\ Taxes}}$ = 10.52(1-.30)=7.36%

c) At Premium

$=\frac{10}{110} \times 100$=9.09%

$k_{d_{After\ Taxes}}$ = 9.09(1-.30)=6.36%

Let us take one more example for computing Cost of Capital for Irredeemable Debt;

Illustration 2 Sunshine Ltd. issues Rs 10,00,000 10% Debentures of Rs 100 each at a premium of 5%. Issue expenses include Re1 for underwriting commission 0.50 paise brokerage and Rs 1.50 other expenses. Rate of tax is 30%. Calculate Cost of Debt.

Net proceeds=105-(1+.5+1.5)=Rs 102

$k_{d_{Before\ Taxes}}=\frac{Interest}{Net\ Proceeds} \times 100$

$k_{d_{Before\ Taxes}}=\frac{10}{102} \times 100$=9.80%

$k_{d_{After\ Taxes}}$ = 9.80(1-.30)=6.86%

7.4.2 COST OF REDEEMABLE DEBT

When the debentures or bonds or term loans are redeemable after a definite time period then the cost of debt shall be computed differently. These debenture or bonds are repayable after a definite period. Such debentures have legal binding or obligation to redeem the amount to the debenture holders either at some predefined time period during the lifetime of the debt or as a lump sum at the end of its maturity. In other words, cost of debt is the discount rate which equates the net realization from the issue of debentures to the interest and principal repayments.

$P=\sum_{t=1}^{n} \frac{I(1-t)}{(1+k_d)^t} + \frac{R}{(1+k_d)^n}$

Where;

P= Net Amount realized from debentures

K_d=After tax cost of debt

T = Tax rate

R= Redemption Price per Debenture

n= Maturity Period or Number of years in which debt is to be redeemed

Further, when the difference amount between the redemption price and Net Amount realized from debentures can be written off across the life span of the debentures then the following formula shall be used for computation as written off amount is tax deductible;

$$k_{d_{After\ Taxes}} = \frac{I\,(1-t)+\frac{1}{n}(R-P)(1-t)}{\left(\frac{R+P}{2}\right)}$$

In nutshell. Cost of Debt can be calculated as;

$$k_{d_{Before\ Taxes}} = \frac{I+\frac{1}{n}(MV-NP)}{\left(\frac{MV+NP}{2}\right)}$$

$$k_{d_{After\ Taxes}} = \frac{I+\frac{1}{n}(MV-NP)}{\left(\frac{MV+NP}{2}\right)} \times (1-t)$$

Where;

I= Interest

n= Number of years in which debt is to be redeemed or to maturity

MV=Proceeds at par or redeemable value of debt at the time of maturity or Maturity Value

NP= Net Proceeds or selling value minus discount and flotation expenses

T= Tax rate

Let take few examples of computing Cost of Capital for Redeemable Debt;

Illustration 3 A company issued 10,000(10 years) 10% debentures of Rs 100 each at a discount of 4%. Cost of issue is 2% and tax rate is 30%. Calculate cost of debenture.

Interest= Annual interest $+\frac{\text{Discount and Expenses}}{\text{Period of Issue}}$

$10+\frac{4+2}{10}$=Rs. 10.60

Net proceeds=Par value-$\left(\frac{\text{Discount+Expenses}}{2}\right)$

=100-$\frac{4+2}{2}$=Rs. 97

$k_{d_{Before\ Taxes}}$=$\frac{Interest}{Net\ Proceeds} \times 100$

$$= \frac{10.60}{97} \times 100$$

$$= 10.92\%$$

$K_{d\ After\ taxes}$= 10.92(1-.30)=7.64%

or

I=10%

MV=100

Net Proceeds= Par value-(discount+ expenses)=100-(4+2)=94

Kd = $\frac{I+\frac{1}{n}(P-NP)}{\left(\frac{P+NP}{2}\right)}$ or $\frac{I+\frac{1}{n}(MV-NP)}{\left(\frac{MV+NP}{2}\right)}$

$$= \frac{10 + \frac{1}{10}(100 - 94)}{\left(\frac{100 + 94}{2}\right)}$$

=$\frac{10+\frac{6}{10}}{\left(\frac{100+94}{2}\right)}$ =$\frac{10.60}{97}$=10.92%

$K_{d\ After\ taxes}$= 10.92(1-.30)=7.64%

Illustration 4 ABC Limited issued 10% Debentures of the face value of Rs 500 at par and floatation cost is 4% and will be redeemed after 10 years at a premium of 5%. Tax rate is 30%. Calculate Cost of Debentures.

Interest=Rs 50

MV= 500+25=525

NP=500-20=480

N=10

$K_{d(\text{Before Taxes})} = \frac{I+\frac{1}{n}(P-NP)}{\left(\frac{P+NP}{2}\right)}$ or $\frac{I+\frac{1}{n}(MV-NP)}{\left(\frac{MV+NP}{2}\right)}$

$= \frac{50+\frac{1}{10}(525-480)}{\left(\frac{525+480}{2}\right)}$

$= \frac{50+4.5}{502.5} \times 100$

$= \frac{54.5}{502.5} \times 100 = 10.84\%$

$K_{d(\text{After Taxes})} = 10.84(1-.30) = 7.59\%$

Check Your Progress- A

Q1. What do you mean by Cost of Capital?

Q2. What are the components of cost of capital?

Q3. How can you determine Cost of Debentures?

7.5 COST OF EQUITY

Assessing the rate of return expected by shareholder is difficult as the dividends received by equity shareholders are not specified in some legal contract. The main objective of a company is maximizing shareholder's wealth. Therefore management makes all efforts to strengthen position of equity shareholders and this effort requires stream of decisions in respect to capital expenditures and financing pattern.

The cost of equity shall be defined as "the minimum rate of return that a company must earn on the equity-financed portion of an investment project in order to leave the market price of the firm's common stock unchanged." (Van Horne and Wachowicz)

Cost of equity is the rate of return that company pays to the equity shareholders for funds supplied by them. This payment is made in lieu of their expectation for dividends and capital gains and also for the returns which they could have received by investing the funds somewhere else. Company estimates cost of equity also to assess the relative value of investments both for internal projects and opportunities for external acquisitions or proposals. The market value of shares is primarily dependent upon the demand and supply forces prevailing in the capital market. Therefore, the cost of equity is the required rate of return to the shareholder which equates the present value of the expected dividends and the future market value of the sales. There are various methods of calculation of equity share capital these are dividend yield method, divided growth method, price earning and capital asset pricing approach. Let us study these methods in detail;

7.5.1 DIVIDEND YIELD METHOD

According to this approach, the cost of equity is determined on the basis of the Dividend per share divided by current market price of equity share or the Net proceeds from the sale of the Shares. This method assumes that the cost of equity is the discount rate that equates the present value of the future dividend per share with the market price of the share. Hence, it is also termed as Dividend Price Ratio method or D/P Ratio Method.

$$Ke=\frac{DPS}{MP}\times 100$$

Where;

DPS=Dividend per share or Expected Dividend per Share

MP=Market price per share

Illustration 5 Horizon Limited issued 10,000 equity shares of Rs 100 each fully paid. The present market price of these shares is Rs 150 per share. The company has paid Rs 15 per share as dividend. Find the Cost of Equity capital.

$Ke=\frac{DPS}{MP}\times 100$

$=\frac{15}{150}\times 100$

=10%

However, this approach suffers from the following limitations;

1. It does not take future earnings into consideration.
2. It assumes that future equity dividend to be constant and does not allow for any growth rate.
3. This does not consider the fact that the shareholders receive growth in dividends as well as capital gain whenever the shares are sold.
4. This excludes proceeds from retained earnings and ignores the fact that the rise in share prices can be attributed to retained profits, rather than high dividends.

7.5.2 DIVIDEND GROWTH METHOD

According to this approach, the cost of equity is determined on the basis of the Dividend per share plus the rate of growth in dividend. This means that it assumes that the growth rate in dividend is equivalent to growth rate in earning per share. This model is supported by Shapiro, Gordon and Solomon. It recognizes that future growth in dividend is accounted to the current dividend yield. It further recognizes that the returns on the securities shall be appropriately calculated when the future earnings-price ratio is the same as the current price earnings ratio. However, it is practically difficult to assume that growth in dividends shall be equivalent to the growth rate in earnings per share. Further, quantification of growth in dividend per share is again a subject to the critics as these may varies as per profitability of the concern or as per the circumstances prevailing in the economy and even influenced by other factors influencing the growth. Therefore, theoretically, it can support in determining the expectation of the investors however, practically it is difficult to predict the growth in the uncertain and imperfect market conditions.

$Ke=\frac{DPS}{MP}+g$

Or

$Ke=\frac{DPS}{MP}\times 100+g$

Where;

DPS=Dividend per Share or Expected Dividend per Share

MP=Market price per share

g = growth rate

However, this approach is criticized because of the following reasons;

a) It is practically difficult to predict about future growth pattern as these are uneven and may vary.

b) Only past data can be used to predict for future growth.

c) The dividend growth is dependent upon retained earnings of the company and predicting growth on the basis of the retained earnings is also a strenuous task.

Illustration 6 The average rate of dividend paid on equity share capital for the last five years is estimated by the Finance Manager of ABC Limited as 10%. The growth rate in dividend has been 4% per annum. The market price of equity shares is Rs 150 per share. The Face Value of the equity share is Rs 100. Find the Cost of Equity Capital.

$Ke=\frac{DPS}{MP}+g$

$=\frac{10}{150}\times 100+4$

=10.67%

Illustration 7 Shares of ABC Limited is quoted at Rs 10 on the Bombay Stock Exchange; the current price per share is Rs 25. The gross dividends over the last four years have been Rs 2.25, Rs 2.7, Rs 3.24 and 3.88. You have to calculate cost of equity share.

From the trend of gross dividends it is deduced that dividend are growing @ 20%

Expected current year dividend $=1.45\times\frac{120}{100}$ = Rs. 4.66

$Ke=\frac{4.66}{25}+.20$

.1864+.20=.3864 or 38.64%

7.5.3 PRICE EARNING METHOD

According to this method, the cost of equity can be calculated on the basis of Earning per share and market price of the share. It is based on the assumption that the investors capitalize the stream of future earnings of the share and the earning of a share that are not distributed to the shareholders. That means it takes into account both dividends as well as retained earnings for the computation of cost of equity. This method assumes that even if earnings are not

distributed to the shareholders as dividends, it is retained by the company as surplus which later magnifies the growth of earnings of the company as well as market price of the share. This is also called as Earning/Price Ratio Method or E/P ratio Method. The other option is to calculate on the average rate of earning and the average market price of equity shares.

$$\text{Ke}=\frac{Earning\ per\ share}{Market\ price\ per\ share}\times 100$$

Illustration 8 The issued capital of Sunshine Limited is 40000 equity shares of Rs 10 each, fully paid. Its annual income after interest and taxes is Rs 2,00,000. The market price of the company's share is Rs 30. Calculate the Cost of Equity.

Earnings per Share(EPS) $=\frac{EAT}{No\ of\ Shares}$

$=\frac{200000}{40000}$

=Rs 5

$\text{Ke}=\frac{5}{30}\times 100=16.67\%$

However,

Assumptions of this approach are as mentioned as under;

1. Constant earnings per share is assumed for future.
2. There should be either 100 per cent retention ratio or 100 per cent dividend payout ratio
3. The company's source of finance is through equity shares and debt is not employed by the company.

7.5.4 CAPITAL ASSET PRICING MODEL

The CAPM divides the cost of equity into two parts, one being risk free rate of return and the other additional risk premium for investing in a particular or investment. Risk free rate of return is the return gained by investing into government securities and the risk premium is the product of the premium required on an average-risk investment also called as the "market risk premium" and the relative risk of the security termed as beta.

The Capital Asset Pricing Model (CAPM) is a model of equilibrium that calculates the relationship between risk and expected return of an asset based on the sensitivity of the asset to general stock market movements. CAPM is a model "that describes the relationship between risk and expected(required)return; in this model, a security's expected (required)

return is the risk free rate plus a premium based on the systematic risk of the security". (Van Horne and Wachowicz, pp 106, 13th Edition)

According to this method, the cost of equity is calculated by the following equation;

$K_e=R_f+\beta_i(R_m - R_f)$

Where;

R_f=Risk free rate of return

β_i=Beta of the Investment

R_m=Rate of Return on market portfolio

Illustration 8 Sundram Ltd expects a return of 10% on the stock. The Stock's beta is 1.60. The risk free rate of interest on government securities is 4%. Calculate cost of equity on the basis of Capital Asset Pricing Model.

$K_e=R_f+\beta_i(R_m - R_f)$

=4%+1.60(10%-4%)

=4%+1.60(6%)

=13.6%

7.6 COST OF PREFERENCE SHARES

Apparently, the cost of the preferred share capital is the dividend paid and accrued by the company. The preference share shall be given at the fixed rate of the dividend on the face value of the shares. Generally, dividends are paid on a fixed rate but it is not the legal biding on the management to pay dividends. But it is generally paid when company makes adequate profits. Therefore, it is sometimes inferred that since it is not legal binding on the company to pay dividend on preference shares hence, it does not have a cost. But, nonpayment of preference dividends adversely affects the company's reputation as well as it is critical to the basic existence of equity shareholders. Since, nonpayment of dividends will result into equal voting rights by preference shareholders and as a result equity shareholders will lose the control over the company. Further, it will also impact the raising of funds by the company. Therefore, preference shares also have a cost.

The par value of the preference shares capital shall be adjusted to assess Net proceeds when these shares are issued at premium or discount. Further, if there are certain issue expenses then these have to be deducted to find Net Proceeds.

7.6.1 COST OF IRREDEEMABLE PREFERENCE SHARES

Dividend paid on preference shares divided by Net Proceeds is the cost of irredeemable Preference shares. Preference Shares that are not payable until the liquidation of the corporation is known as an irredeemable preference share.

$$K_{p}=\frac{D_p}{NP}$$

Where K_p= Cost of irredeemable preference shares

D_p= Preference Shares Dividend

$NP =$ Net proceeds received from issue of preference shares after meeting the issue expenses.

The above formula is computed on after tax basis therefore to calculate K_p before tax, Cost of preference shares after tax is divided by (1-t). However, for decision making and for further computational purposes, cost of preference shares is considered only on after tax purposes.

Illustration 9 ABC limited issued 5,000 10% Preference Shares of 100 each. Cost of issue is Rs5 per share. Calculate Cost of Preference Share Capital (before tax as well as after tax) if shares are issued ;

a) at par
b) at 6% premium
c) at 4% discount.

Tax rate prevailing is 30%

a) $K_{p(after\ tax)}=\frac{D_p}{NP}$

$=\frac{10}{95}\times 100 = 10.52\%$

$K_{p(before\ tax)}=\frac{D_p}{NP}$

$=\frac{10.52}{(1-.30)}=15.02\%$

b) $K_{p(after\ tax)}=\frac{D_p}{NP}$

$=\frac{10}{106-5}\times 100 = 9.90\%$

$K_{p(before\ tax)}=\frac{D_p}{NP}$

$=\frac{9.90}{(1-.30)}=14.14\%$

c) $K_{p(after\ tax)}=\frac{D_p}{NP}$

$=\frac{10}{96-5}\times 100 = 10.98\%$

$K_{p(before\ tax)}=\frac{D_p}{NP}$

$=\frac{10.98}{(1-.30)}=15.68\%$

Illustration 10 XYZ limited issues 5,000 6% Preference Shares of Rs 100 each at par and the Company incurs the following expenses;

Underwriting commission is 2%, brokerage is 2% and other expenses are 500.

Calculate Cost of Preference Share Capital.

a) $K_{p(after\ tax)}=\frac{D_p}{NP}$

Net Proceeds=100-2-2-$\frac{500}{5000}$=96-.1=95.9

$=\frac{6}{95.9}\times 100 = 6.25\%$

$K_{p(before\ tax)}=\frac{D_p}{NP}$

$=\frac{6.25}{(1-.30)}=8.93\%$

7.6.2 COST OF REDEEMABLE PREFERENCE SHARES

Whenever preference shares are issued with a specified maturity date then the cost of capital is assessed as the discount rate that equates the sale value of preference shares after deduction of discount and floatation expenses with the present value of dividends and principal repayment that will be made at a future date. Accordingly, the cost of preference shares in such case shall be calculated as under;

$$Kp=\frac{D_p+\left(\frac{MV-NP}{N}\right)}{\left(\frac{MV+NP}{2}\right)}$$

Where,

K_p= Cost of Irredeemable Preference Shares.

D= Constant Annual Preference Dividend Payment

N= Number of years to redemption

MV=Maturity value of Preference Shares

NP=Net Proceeds

Dividend on preference shares is taken as an appropriation of profits and it not a charge against profits; therefore it considered that the cost is considered on after-tax basis.

Illustration 11 ABC Limited issues 60,000 12 % preference share of Rs 100 each at 2% discount. These preference shares are to be redeemed after 10 years at 10% premium. The flotation cost is 6 per share and tax rate is 30%. Find out the cost of preference share capital.

$$Kp=\frac{D_p+\left(\frac{MV-NP}{N}\right)}{\left(\frac{MV+NP}{2}\right)}$$

Net Proceeds=98-6=92
MV==110
PD=12%

$$Kp=\frac{D_p+\left(\frac{MV-NP}{N}\right)}{\left(\frac{MV+NP}{2}\right)}$$

$$=\frac{12+\frac{110-92}{10}}{\frac{110+92}{2}}$$

$$=\frac{12+1.8}{101}=13.66\%$$

Note:

Always remember that cost of preference shares is paid out of the profit after tax therefore cost of preference share capital does not require any tax adjustment. Further, interest on debt is tax deductible and interest on preference dividend is not tax deductible. Hence, there is no tax shield provided by Preference Shares. Therefore generally after tax cost of preference shares is considerably on the higher side than the after tax cost of debt.

7.7 COST OF RETAINED EARNING

Retained Earnings is the internal source of financing and therefore it is generally thought that Retained earning does not constitute cost. But this is not the case. Even Retained Earning does have cost. The cost of the retained earnings is basically opportunity cost of the implied expense to the shareholder who is not given opportunity to invest the retained earnings in alternative source of financing. These are the funds accumulated by the company for various years that are kept out from the funds available for distribution. Accordingly, this fund can be

used for diversification, expansion, project financing and the likes. Funds raised by any sort of financing have implied capital costs as soon as they are invested. Therefore, the retained earnings are basically the distributable profits available for equity shareholders. If these are appropriated then this amount could have been reinvested by equity shareholders. Thus, the cost of retained earnings is the rate of return which the existing shareholders can avail if they invest after tax dividends in various other alternatives available. Accordingly, the cost of retained earnings is the opportunity cost of dividends foregone by shareholders.

If this retained earnings are distributed to the equity shareholders then it will attract personal taxation. From this point of view cost of retained earning can be calculated using the given formula;

K_r= Dividend rate (1-t)

Where;

K_r = Cost of Retained Earning

D= Dividend Rate

T= Tax Rate for individuals

If shareholders incur some brokerage cost for investing the dividends received then such amount shall be deducted from the funds available for reinvestment.

The alternative method for the computation of cost of retained earning taking into account that if an offer is made to the shareholders for subscribing to right shares instead of dividends from the retained profits is distributed, then the shareholders will willingly subscribe to right shares in expectation of assured returns. It can also be stated in this way that if the retained profits are distributed in the form of dividends to the shareholders and later the amount is call back by offering the right shares then the dividends paid shall be levied with personal taxation and the shareholder can invest in right shares only to the amount of the net dividends so received from the company. According to this right offer approach, if the retained earnings are not distributed then the price of shares will increase to the extent of retained profits which will be taxed as per the capital gains for the individual shareholder. In such case, the following formula shall be used for computing cost of retained earnings;

$$K_{re} = \frac{D(1-T_i)}{P(1-T_c)}$$

Where;

K_r = Cost of Retained Earning

D= Dividend Rate

T_i = Marginal tax rate on income of individual shareholder.

T_c=Capital gains tax

P = market price per share

Let us learn its computation using the above formula;

Illustration 12 ABC Ltd. has paid an equity dividend of Rs 2 per share. It is further provided to you that market price of its equity shares is Rs 30. The marginal tax rate is 30% and capital gain tax being 20%. Let us now compute cost of retained earnings;

$$K_{re} = \frac{2(1-.30)}{30(1-.20)}$$

$$= \frac{1.4}{24} = 0.05833 \text{ or } 5.83\%$$

The following method is also used for computing cost of retained earnings;

$$K_{re} = \frac{AD(1-T_d)}{RE(1-T_c)}$$

Where;

K_{re} = Cost of Retained Earning

AD= Alternate Dividend Income

T_d = Tax rate on dividend income

T_c=Capital gains tax

RE= Retained Earning

Let us calculate cost of retained earning using the above formula;

Illustration 13 Saumya holds 5000 equity shares of ABC Limited of Rs 100. ABC Limited returns were Rs 20 per share and the company distributed Rs 15 per share as dividend and remaining amount was retained by the company. The market price of equity share is Rs 120 per share. Personal tax rate of Saumya is 30%. Calculate Cost of Retained Earning.

Retained Earnings of Saumya $=5000 \times 5 = 25{,}000$

Alternative investment can be made by Saumya for the amount of Retained Earnings$=\frac{25{,}000}{120}=208.33$

Alternative Dividend Income$=208 \times 20 = 4160$

$=\frac{AD(1-T_d)}{RE(1-T_c)}=\frac{4160(1-.30)}{25000}$=11.64%

Note: It is assumed that the above hypothetical example does not attract capital gain tax.

Cost of retained earning can also be calculated after adjusting tax and cost of purchasing new securities. As shareholders have to pay taxes on dividend received. Further if the amount is reinvested in other alternatives then the brokerage cost shall be levied for making investments. Accordingly, the cost of retained earnings shall also be computed as per the formula given;

$K_r = \left(\frac{E}{NP} + g\right) \times (1-t) \times (1-b)$

$= k_e \times (1-t) \times (1-b)$

Where

$k_e =$ Cost of Equity Capital

T=tax rate

b=Brokerage cost

However, the cost of retained earnings is generally less than the cost of equity shares.

Illustration 14 For example, A company's cost of equity capital is 15% and tax rate of majority of shareholders is 30%. The company pays brokerage of 2%, then the cost of retained earnings in this case shall be;

= 15% (1 – 30%) (1 – 2%)

= 15 ×.70 ×0.98

= 10.29%

Note-The Book value weights of specific cost of capital are taken in face value or in other words you can say the structure of capital as given in the balance sheet.

7.8 WEIGHTED AVERAGE COST OF CAPITAL

Cost of equity, Cost of Debt, Cost of Preference Shares and Cost of Retained Earning individually plays a vital role while analyzing the impact an individual cost of capital on the firm. However, you also need to calculate weighted average cost of capital and marginal cost of capital for various financial decisions. Simple average cost of capital will not give any meaning unless assessed in totality. Therefore, weighted average cost of capital is the rate that a firm on an average pays to all its securities holders to finance its financial structure.

The weighted average cost of capital serve as a benchmark or a parameter in appraising profitability of the company or a firm.

The relative proportion of different sources of financing are assign weights. These weights can be taken either as per book value or as per capital structure weights or as per market value. Weights that are based on book value are placed on the basis of balance sheet values. The weights are calculated as per the source of the fund's book value divided by the total fund's book value. Weights on the basis of capital structure are calculated as per the basis of desired capital structure. The weights are placed to the component of capital structure to find out cost of capital. Under market value approach, you have to assign the weights to cost of equity, cost of preference shares, cost of debt and cost of retained earnings on the basis of market value of the capital component divided by the market value of all capital and capital components opted by the company for financing.

Therefore, weights are assigned to the individual cost of capital depending upon its proportion in the capital structure. The weighted average cost of capital can be calculated before tax or after tax basis. But the most appropriate is to calculate weighted average cost of capital on after tax basis.

Therefore the formula for calculating weighted average cost of capital is

$K_o = K_d(1\text{-}t)\times wg + K_e \times wg + K_{ps} \times wg + K_{re} \times wg$

K_o= Overall Cost of Capital

K_d= Cost of Debt

K_{ps}= Cost of Preference Shares

K_e= Cost of Equity

K_{re} = Cost of Retained Earning

Wg= Weight in the capital structure

It can also be written as $K_o = \frac{\sum WX}{\sum w}$

Where x cost of specific source of financing example equity, debt, retained earning etc. and

W is weighted proportion of specific source of capital

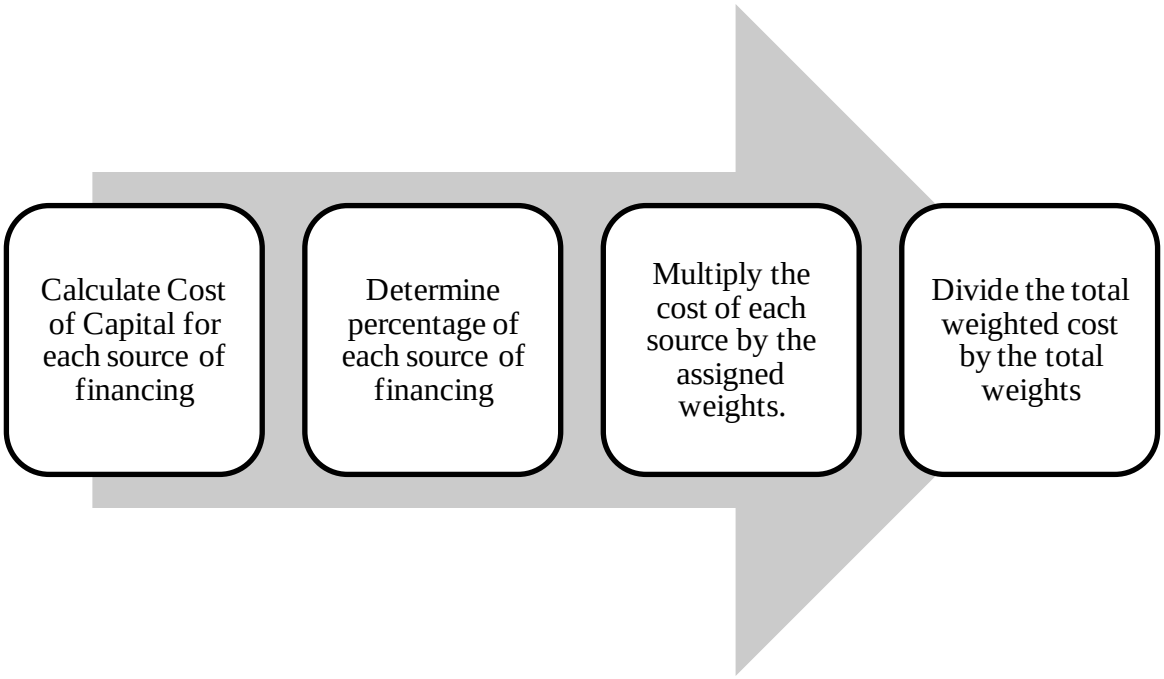

Fig 7.1Step by Step process of computing weighted average cost of capital.

Illustration 15 The following information is provided by Excel Limited to you. The company requires your consultancy services for planning its capital structure for future. Accordingly, you are expected to calculate the weighted average cost of capital for Excel Limited. Now, let us start calculating the overall cost of capital on the basis of information so provided.

Sources of Funds	**Book Value**	**Market Value**	**Cost of Capital After Tax**
Debentures	1000000	800000	12
Preference Shares	3000000	3500000	15
Equity Shares	4000000	3500000	18
	8000000	7800000	

Let us now calculate overall cost of capital using Book Value and Market Value;

Sources of Funds	**Book Value**	**Weights in Capital Structure**	**Cost of Capital After Tax**	**Weighted Cost**
Debentures	1000000	0.125	12	1.50
Preference Shares	3000000	0.375	15	5.63

Equity Shares	4000000	0.5	18	9.00
	8000000	1		16.13

The weighted cost is computed after multiplying weights in capital structure with after tax cost of capital. The weighted average cost of capital of Excel Limited on the basis of Book Value is computed as under;

$K_o = \frac{\sum WX}{\sum w} = \frac{16.13}{1} = 16.13$

Sources of Funds	**Market Value**	**Weights in Capital Structure**	**Cost of Capital After Tax**	**Weighted Cost**
Debentures	800000	0.1025	12	1.23
Preference Shares	3500000	0.448	15	6.72
Equity Shares	3500000	0.448	18	8.06
	7800000	1		16.01

The weighted average cost of capital of Excel Limited on the basis of Market Value is computed as under;

$K_o = \frac{\sum WX}{\sum w} = \frac{16.01}{1} = 16.01\%$

Illustration 16 Let us take another example, the Surmount Limited submit the following capital structure to you;

6% Preference Shares 4,00,000

Equity Shares of Rs 20 each 5,00,000

8% Debentures 7,00,000

Retained Earnings 6,00,000

The market price of equity shares is Rs 30. The company expects to distribute dividend of Rs 6 per share. The individual tax rate applicable for shareholders is 20% and corporate tax rate is 30%. Company expects you to find its weighted average cost of capital.

For the above example you have to first find specific cost of capital for each component for capital structure.

Cost of Preference Share Capital

$$K_{p\ (after\ tax)} = \frac{Preference\ Dividend}{Net\ proceeds} \times 100$$

$$= \frac{6}{100} \times 100$$

$$= 6\%$$

Cost of Debentures

$$K_{d\ (Before\ tax)} = \frac{Interest}{Net\ proceeds} \times 100$$

$$\frac{9}{100} \times 100 = 9\%$$

$$K_{d\ (after\ tax)} = 9\% \times (1 - .30) = 6.3\%$$

Cost of Equity Shares

$$K_{e\ (after\ tax)} = \frac{DPS}{Market\ Price} \times 100$$

$$\frac{6}{30} \times 100 = 20\%$$

Cost of Retained Earning

$$K_{re\ (after\ tax)} = \frac{AD(1-T_d)}{RE} \times 100$$

Alternative Investment $= \frac{600000}{30}$

$= 20000$ Shares

Alternative Dividend $= 20000 \times 6 =$ Rs 120000

Retained Earnings = Rs 6, 00,000

$$K_{re\ (after\ tax)} = \frac{AD(1-T_d)}{RE} \times 100$$

$$= \frac{120000(1-.20)}{600000} \times 100 = 16\%$$

Sources of Funds	Book Value	Weights in Capital Structure	Cost of Capital After Tax	Weighted Cost
Debentures	700000	0.32	6.30	2.01
Preference Shares	400000	0.18	6.00	1.08
Equity Shares	500000	0.23	20.00	4.6
Retained Earnings	600000	0.27	16.00	4.32
	22,00,000	1		12.01

The weighted average cost of capital of Surmount Limited is computed as under;

$K_o = \frac{\sum WX}{\sum w} = \frac{12.01}{1} = 12\%$

Check Your Progress- B

Q1. How do you ascertain Cost of Equity Shares?

Q2. Write the formula of calculating cost of retained earning?

Q3. What do you mean by weighted average cost of capital?

7.9 MARGINAL COST OF CAPITAL

The weighted average cost of new or incremental capital is termed as marginal cost of capital. It is calculated for new or incremental capital instead of sources of funds raised previously by the company. Here, weights are assigned in proportion to funds a company wanted to raise. Hence, it is used for additional funds a company intends to employ and accordingly marginal weights are employed to calculate marginal cost of capital. It shall be equal to weighted average cost of capital when company utilizes the existing proportion of finances and partial cost of component of capital structure. However, it shall be different than the weighted average cost of capital due to the change in magnitude and cost of various sources of funds used to raise additional funds. But it is also true that, in general, weighted average cost of capital is more close in achieving the basic objective of financial management i.e. maximization of shareholders wealth.

7.10 SUMMARY

In this unit you learnt that cost of capital is useful in planning optimal capital structure, expenditure appraisal, and measurement of financial results. The cost of capital is the minimum rate of return that is expected by the company to earn to meet the expectations of the equity shareholders or various categories of investors. Therefore, there are broadly two elements of cost of capital these are, a risk-free rate of interest and a risk premium, which is the compensation an investor would receive for a perceived risk level. Business risk refers to the changes in EBIT due to changes in sale revenues whereas financial risk refers to the risk associated with the capital structure of financial plan of a business. The various sources of finance that company uses for raising funds are equity shares, debentures, term loans, bonds, retained earnings etc. In this unit you also learnt that marginal cost of capital is different than the weighted average cost of capital due to the change in magnitude and cost of various sources of funds used to raise additional funds.

7.11 GLOSSARY

Cost of capital-It is the minimum rate of return that a firm should get so that it can maintain its market value of the shares and thereafter be able to maintain value of a firm.

Cost of equity-It is the rate of return that company pays to the equity shareholders for funds supplied by equity shareholders. It is the minimum rate of return that a company must earn on the equity-financed portion of an investment project in order to leave the market price of the firm's common stock unchanged.

Irredeemable Preference Shares-Preference Shares that are not payable until the liquidation of the corporation is known as an irredeemable preference share.

Marginal Cost of Capital-The weighted average cost of new or incremental capital is termed as marginal cost of capital. It is calculated for new or incremental capital instead of sources of funds raised previously by the company.

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7.14 TERMINAL QUESTIONS

Q1. Discuss the relevance of determining cost of capital of an undertaking.

Q2. What do you mean by cost of capital? Discuss its importance for investors as well for the company.

Q3. What is meant by cost of capital? How do you determine cost of capital for different sources?

Q4.How do you determine the following;

a) Cost of Irredeemable Preference Shares.

b) Cost of Redeemable Debt.

c) Cost of Retained Earnings.

Q5. What is the difference between business risk and financial risk? Explain the method of its computation using a hypothetical example.

Q6. What do you mean by weighted average cost of capital?

Numerical Questions

Q7. Sundar limited issues 6,000 5% Debentures of Rs 150 each at a premium of 10%. The cost of the issue is 4%. The rate of tax applicable to the company is 30%. Compute the after tax cost of Debentures.

Q8. Sunshine Ltd. issues 14% Debentures of face value Rs. 100 each and realizes Rs. 80 per Debenture. The Debentures are redeemable after 10 years at a premium of 10%. Calculate Cost of Debentures assuming tax rate of 30%.

Q9. Ms. Jasmin holds 2000 equity shares of ABC Limited of Rs 100. ABC Limited returns were Rs 15 per share and the company distributed Rs 10 per share as dividend and remaining amount was retained by the company. The market price of equity share is Rs 100 per share. Personal tax rate applicable for Ms. Jasmin is 30%. Calculate Cost of Retained Earning.

Q10. A Company intends to issue 2000 8% Preference Shares of Rs 100 each. The other expenses of capital issue are underwriting 2%, brokerage,3% and Printing 500. Calculate cost of capital if issue has been made;

a) at par value

b) on discount of Rs 5 per share

c) on premium of Rs 5 per share.

The following details are available:

Equity Rs. 5, 00,000, It is expected that dividend shall be payable @10%

Tax Rate 30%

6% Preference Rs. 2, 00,000

7% Loan Rs. 3, 00,000

You are required to calculate Weighted Average Cost of Capital.

Q11. Mission Ltd. share with a face value of Rs 10 each are quoted at Rs 60 in the stock market. Current rate of dividend is 30% and this is expected to grow at the rate of 3%. Calculate the cost of equity capital of the company.

Q12. A firm has Earning per Share as Rs. 5 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.

Q13. Samruddhi Ltd has its equity shares of Rs 8 each quoted in the stock market has market price of Rs 50. It is expected that annual growth rate of 5% and a dividend of Rs 4 per share has been paid by the company for the current year. Calculate cost of capital.

Q14. From the following information, calculate the cost of equity capital using CAPM approach. Required rate of return on risk free security is 12% and required rate of return on market portfolio of investment is 15%. It is also given that firms beta is 1.6.

Q15. The following details are provided regarding amount and specific cost of each capital;

Type of Capital	Book Value	Market value	Specific cost of capital
Debentures	3,50,000	4,00,000	12%
Preference Shares	2,00,000	2,00,000	13%
Equity Shares	4,00,000	7,70,000	15%
Retained Earning	1,50,000		10%
	11,00,000		

You are required to calculate weighted average cost of capital using;

a) Book value Weights

b)Market Vale as weights

Assume tax rate as 30%