

The Cost of Capital

1. Introduction

The **cost of capital** is the company's cost of using funds provided by creditors and shareholders. A company's cost of capital is the cost of its long-term sources of funds: debt, preferred equity, and common equity.

Ezra Solomon defines “**Cost of capital is the minimum required rate of earnings or cutoff rate of capital expenditure**”.

According to Mittal and Agarwal “**the cost of capital is the minimum rate of return which a company is expected to earn from a proposed project so as to make no reduction in the earning per share to equity shareholders and its market price**”.

According to Khan and Jain, cost of capital means “**the minimum rate of return that a firm must earn on its investment for the market value of the firm to remain unchanged**”.

2. Significance of Cost of Capital:

1. Maximisation of the Value of the Firm:

For the purpose of maximisation of value of the firm, a firm tries to minimise the average cost of capital. There should be judicious mix of debt and equity in the capital structure of a firm so that the business does not to bear undue financial risk.

2. Capital Budgeting Decisions:

Proper estimate of cost of capital is important for a firm in taking capital budgeting decisions. Generally cost of capital is the discount rate used in evaluating the desirability of the investment project. In the internal rate of return method, the project will be accepted if it has a rate of return greater than the cost of capital. In calculating the net present value of the expected future cash flows from the project, the cost of capital is used as the rate of discounting. Therefore,

cost of capital acts as a standard for allocating the firm's investible funds in the most optimum manner. For this reason, cost of capital is also referred to as cut-off rate, target rate, hurdle rate, minimum required rate of return etc.

3. Decisions Regarding Leasing:

Estimation of cost of capital is necessary in taking leasing decisions of business concern.

4. Management of Working Capital:

In management of working capital the cost of capital may be used to calculate the cost of carrying investment in receivables and to evaluate alternative policies regarding receivables. It is also used in inventory management also.

5. Dividend Decisions:

Cost of capital is significant factor in taking dividend decisions. The dividend policy of a firm should be formulated according to the nature of the firm—whether it is a growth firm, normal firm or declining firm. However, the nature of the firm is determined by comparing the internal rate of return (r) and the cost of capital (k) i.e., $r > k$, $r = k$, or $r < k$ which indicate growth firm, normal firm and decline firm, respectively.

6. Determination of Capital Structure:

Cost of capital influences the capital structure of a firm. In designing optimum capital structure that is the proportion of debt and equity, due importance is given to the overall or weighted average cost of capital of the firm. The objective of the firm should be to choose such a mix of debt and equity so that the overall cost of capital is minimised.

7. Evaluation of Financial Performance:

The concept of cost of capital can be used to evaluate the financial performance of top management. This can be done by comparing the actual profitability of the investment project undertaken by the firm with the overall cost of capital.

3. Measurement of Cost of Capital:

Cost of capital is measured for different sources of capital structure of a firm. It includes cost of debenture, cost of loan capital, cost of equity share capital, cost of preference share capital, cost of retained earnings etc.

A. The cost of debt

The **cost of debt** is the cost associated with raising one more dollar by issuing debt. Suppose you borrow one dollar and promise to repay it in one year, plus pay \$0.10 to compensate the lender for the use of her money. Since Congress allows you to deduct from your income the interest you paid, how much does this dollar of debt really cost you? It depends on your marginal tax rate -- the tax rate on your next dollar of taxable income. Why the marginal tax rate? Because we are interested in seeing how the interest deduction changes your tax bill. We compare taxes with and without the interest deduction to demonstrate this.

Suppose that before considering interest expense you have \$2 of taxable income subject to a tax rate of 40 percent. Your taxes are \$0.80. Now suppose your interest expense reduces your taxable income by \$0.10, reducing your taxes from $\$2.00 \times 40 \text{ percent} = \0.80 to $\$1.90 \times 40 \text{ percent} = \0.76 . By deducting the \$0.10 interest expense, you have reduced your tax bill by \$0.04. You pay out the \$0.10 and get a benefit of \$0.04. In effect, the cost of your debt is not \$0.10, but \$0.06.

Let K_i represent the cost of debt per year before considering the tax deductibility of interest, k_d represent the cost of debt after considering tax deductibility of interest, and t be the marginal tax rate.

Case 1: When the debentures are issued and redeemable at par:

$$K_d = K_i (1-t)$$

Where K_i = Interest/Net Proceeds of the issue of debenture

Example 1: The cost of debt

Problem

Suppose the Plum Computer Company can issue debt with a yield of 6 percent. If Plum's marginal tax rate is 40 percent, what is its cost of debt?

Solution

$$k_d = 0.06 (1 - 0.40) = \mathbf{0.0360 \text{ or } 3.6 \text{ percent}}$$

Case 2: When the debentures are issued at a premium or discount but redeemable at par

$$K_d = I/NP (1 - t)$$

where, K_d = Cost of debenture

I = Annual interest payment

t=tax rate

N_p = Net proceeds from the issue of debenture.

Case 3: When the debentures are redeemable at a premium or discount and are redeemable after 'n' period:

$$K_d = I(1-t) + 1/N(R_v - NP) / \frac{1}{2} (R_v + NP)$$

where K_d = Cost of debenture .

I = Annual interest payment

t = Tax rate

NP = Net proceeds from the issue of debentures

R_y = Redeemable value of debenture at the time of maturity

Example 2:

- (a) A company issues Rs. 1,00,000, 15% Debentures of Rs. 100 each. The company is in 40% tax bracket. You are required to compute the cost of debt after tax, if debentures are issued at (i) Par, (ii) 10% discount, and (iii) 10% premium.
- (b) If brokerage is paid at 5%, what will be the cost of debentures if issue is at par?

(a) We know, Cost of Debenture $K_d = \frac{I}{NP}(1 - t)$

(i) Issued at par : $K_d = \frac{Rs. 15,000}{Rs. 1,00,000}(1 - 0.4) = 0.09$ or 9%.

(ii) Issued at discount of 10%

$$K_d = \frac{Rs. 15,000}{Rs. 90,000}(1 - 0.4) = 0.10$$
 or 10%

(iii) Issued at 10% premium

$$K_d = \frac{Rs. 15,000}{Rs. 1,10,000}(1 - 0.4) = 0.0818$$
 or 8.18%.

(b) If brokerage is paid @ 5% and debentures are issued at par

$$K_d = \frac{Rs. 15,000}{Rs. 95,000 \text{ (i.e., Rs. 1,00,000 - Rs. 5,000)}}(1 - 0.4) = 0.0947$$
 or 9.47%.

Note: While calculating the real cost of debt, not only the interest rate but also certain imputed costs of raising funds from debts should be considered.

Example 3:

ZED Ltd. has issued 12% Debentures of face value of Rs. 100 for Rs. 60 lakh. The floating charge of the issue is 5% on face value. The interest is payable annually and the debentures are redeemable at a premium of 10% after 10 years.

What will be the cost of debentures if the tax is 50%?

Solve it and share the answer with me.

B. Cost of Preference Share Capital:

For preference shares, the dividend rate can be considered as its cost, since it is this amount which the company wants to pay against the preference shares. Like debentures, the issue expenses or the discount/premium on issue/redemption are also to be taken into account.

(i) The cost of preference shares:

$$(KP) = DP / NP$$

Where, DP = Preference dividend per share

NP = Net proceeds from the issue of preference shares.

(ii) If the preference shares are redeemable after a period of 'n', the cost of preference shares (KP) will be:

$$K_p = \frac{DP + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)}$$

where NP = Net proceeds from the issue of preference shares

RV = Net amount required for redemption of preference shares

DP = Annual dividend amount.

Note:

- 1. There is no tax advantage for cost of preference shares, as its dividend is not allowed deduction from income for income tax purposes.**
- 2. The students should note that both in the case of debt and preference shares, the cost of capital is computed with reference to the obligations incurred and proceeds received. The net proceeds received must be taken into account while computing cost of capital.**

Example 4:

A company issues 10% Preference shares of the face value of Rs. 100 each. Floatation costs are estimated at 5% of the expected sale price.

What will be the cost of preference share capital (KP), if preference shares are issued (i) at par, (ii) at 10% premium and (iii) at 5% discount? Ignore dividend tax.

Solution:

We know, cost of preference share capital (KP) = DP/P

(i) When preference shares are issued at par i.e., at Rs. 100 per share, $K_p = \frac{\text{Rs. } 10}{\text{Rs. } 95} = 0.1052$ or 10.52%, where, $D_p = 10\%$ of Rs. 100 = Rs. 10, $P = \text{Rs. } 100 - 5\%$ of Rs. 100 = Rs. 95.

(ii) When preference shares are issued at 10% premium (i.e., at Rs. 110 per share)

$$K_p = \frac{\text{Rs. } 10}{\text{Rs. } 104.50} = 0.0956 \text{ or } 9.56\%$$

where $D_p = 10\%$ of Rs. 100 = Rs. 10, $P = \text{Rs. } 110 - 5\%$ of Rs. 110 = Rs. 104.50.

(iii) When preference shares are issued at 5% discount (i.e., at Rs. 95 per share)

$$K_p = \frac{\text{Rs. } 10}{\text{Rs. } 90.25} = 0.1108 \text{ or } 11.08\%$$

where $D_p = 10\%$ of Rs. 100 = Rs. 10, $P = \text{Rs. } 95 - 5\%$ of Rs. 95 = Rs. 90.25.

Example 5:

Ruby Ltd. issues 12% Preference Shares of Rs. 100 each at par redeemable after 10 years at 10% premium.

What will be the cost of preference share capital?

Please solve the qs and share the answer with me

Example 6:

A company issues 12% redeemable preference shares of Rs. 100 each at 5% premium redeemable after 15 years at 10% premium. If the floatation cost of each share is Rs. 2, what is the value of K_p (Cost of preference share) to the company?

Please solve the qs and share the answer with me

C. Cost of Equity Capital

The funds required for a project may be raised by the issue of equity shares which are of permanent nature. These funds need not be repayable during the lifetime of the organisation. Calculation of the cost of equity shares is complicated because, unlike debt and preference shares, there is no fixed rate of interest or dividend payment.

Cost of equity share is calculated by considering

1. The earnings of the company
2. Market value of the shares
3. Dividend per share and
4. The growth rate of dividend or earnings.

Approaches by which the cost of equity capital can be computed are:

(i) Dividend/Price Ratio Method:

An investor buys equity shares of a particular company as he expects a certain return (i.e. dividend). The expected rate of dividend per share (**D₁**) on the current market price per share (**P₀**) is the cost of equity share capital. Thus the cost of equity share capital is computed on the basis of the present value of the expected future stream of dividends.

Thus, the cost of equity share capital (K_e) is measured by:

$$K_e = D_1/P_0$$

Where,

D₁ = Expected dividend per share

P₀ = Current market price per share.

Note: P₀ should be adjusted for any discount, premium and floatation cost of current market price per share, net of any brokerage in case of existing equity.

Example 1:

M Ltd. has issued equity shares of Rs10 each at a premium of 10% after incurring a floatation cost of 4% of the issue price. In keeping with the dividend paid by

similar companies, shareholders expect a dividend of 15% per share. Determine the cost of equity capital.

Please solve it and share the answer.

ii. Dividend/Price plus Growth Method:

Case 1: where dividend grows at a constant rate:

If dividends are expected to grow at a constant rate of 'g' then cost of equity share capital will be:

$$K_e = D_1/P_0 + g$$

Where,

g=growth rate that represents the capital gain yield

$$D_1 = D_0(1+g)$$

This method is suitable for those entities where growth rate in dividend is relatively stable. But this method ignores the capital appreciation in the value of shares. A company which declares a higher amount of dividend out of given quantum of earnings will be placed at a premium as compared to a company which earns the same amount of profits but utilizes a major part of it in financing its expansion programme.

Example 2:

XY Company's share is currently quoted in market at Rs. 60. The expected dividend is Rs. 3 per share and investors expect a growth rate of 10% per year.

You are required to calculate:

(i) The company's cost of equity capital.

- (ii) The indicated market price per share, if anticipated growth rate is 12%.
- (iii) The market price, if the company's cost of equity capital is 12%, anticipated growth rate is 10% p.a., and dividend of Rs. 3 per share is to be maintained.

Solution :

We know, cost of Equity Capital (K_e) = $\frac{D}{P} + g$.

(i) $K_e = \frac{\text{Rs. } 3}{\text{Rs. } 60} + 0.10 = 0.05 + 0.10 = 0.15$ or 15%

(ii) Market Price (P) = $\frac{\text{Dividend (D)}}{\text{Cost of equity capital (K}_e\text{) - Growth rate (g)}}$
 $= \frac{\text{Rs. } 3}{15\% - 12\%} = \frac{\text{Rs. } 3}{3\%} = \text{Rs. } 100.$

(iii) Market Price (P) = $\frac{\text{Rs. } 3}{12\% - 10\%} = \frac{\text{Rs. } 3}{2\%} = \text{Rs. } 150.$

Example 3:

The current market price of a share is Rs. 100. The firm needs Rs. 1,00,000 for expansion and the new shares can be sold at only Rs. 95. The expected dividend at the end of the current year is Rs. 4.75 per share with a growth rate of 6%.

Calculate the cost of capital of new equity.

Solution:

We know, cost of Equity Capital (K_e) = $D/P + g$

(i) When current market price of share (P) = Rs. 100

$K = \text{Rs } 4.75 / \text{Rs. } 100 + 6\% = 0.0475 + 0.06 = 0.1075$ or 10.75%.

(ii) Cost of new Equity Capital = $\text{Rs. } 4.75 / \text{Rs. } 95 + 6\% = 0.11$ or, 11%.

Example 4:

A company's share is currently quoted in the market at Rs. 20. The company pays a dividend of Rs. 2 per share and the investors expect a growth rate of 5% per year.

You are required to calculate (a) Cost of equity capital of the company, and (b) the market price per share, if the anticipated growth rate of dividend is 7%.

Please solve it and share the answer.

Example 5:

Green Diesel Ltd. has its equity shares of Rs. 10 each quoted in a stock exchange at a market price of Rs. 28. A constant expected annual growth rate of 6% and a dividend of Rs. 1.80 per share has been paid for the current year.

Calculate the cost of equity share capital.

Please solve it and share the answer.

**Case 2: Where dividend grows at a varying rate constant rate:
we'll cover this in class**

(iii) Earnings/Price Ratio Method:

This method takes into consideration the earnings per share (EPS) and the market price of share.

This method recognises both dividend and retained earnings unlike the dividend approach which just focused on dividend for computation of cost of equity capital.

Thus, the cost of equity share capital will be based upon the expected rate of earnings of a company. The argument is that each investor expects a certain amount of earnings whether distributed or not, from the company in whose shares he invests.

If the earnings are not distributed 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.

Thus, the cost of equity capital (K_e) is measured by:

$$K_e = E_0/P_0$$

where E_0 = Current earnings per share

P_0 = current Market price per share, net of any brokerage.

If the future earnings per share will grow at a constant rate 'g' then cost of equity share capital (K_e) will be

$$K_e = E_0/P_0 + g$$

Note: Adjustment of Floatation Cost There are costs of floating shares in market and include brokerage, underwriting commission etc. paid to brokers, underwriters etc.

These costs are to be adjusted with the current market price of the share at the time of computing cost of equity share capital since the full market value per share cannot be realised. So the market price per share will be adjusted by $(1 - f)$ where 'f' stands for the rate of floatation cost.

Thus, using the Earnings growth model the cost of equity share capital will be:

$$K_e = E / P (1 - f) + g$$

Example 6:

The share capital of a company is represented by 10,000 Equity Shares of Rs. 10 each, fully paid. The current market price of the share is Rs. 40. Earnings available to the equity shareholders amount to Rs. 60,000 at the end of a period. Calculate the cost of equity share capital using Earning/Price ratio.

Solution :

$$\text{We know, Cost of Equity Capital} = \frac{E}{P}$$

$$E = \text{Earnings per share} = \frac{\text{Rs. } 60,000}{10,000} = \text{Rs. } 6.$$

$$P = \text{Current market price} = \text{Rs. } 40.$$

$$\text{Cost of Equity Capital (K}_e\text{)} = \frac{\text{Rs. } 6}{\text{Rs. } 40} = 0.15\% \text{ or } 15\%.$$

Example 7:

A company plans to issue 10,000 new Equity Shares of Rs. 10 each to raise additional capital. The cost of floatation is expected to be 5%. Its current market price per share is Rs. 40.

If the earnings per share is Rs. 7.25, find out the cost of new equity.

Please solve and share the solution.

iii. Capital Asset Pricing Model (CAPM) Approach:

Limitation of dividend and earning price method is that they do not consider the risk directly. The market price of the share that is considered in the earlier models reflect risk associated with a particular share. A less risky share will command a higher share price and hence a lower cost of equity capital.

The expected return of a security is directly proportional to the degree of risk.

According to the CAPM approach, the return on security is determined by the degree of risk to which the security is exposed. It shows that the expected return on a security is equal to the risk-free return plus a risk premium, which is based on the beta of that security.

A security is exposed to two types of risk:

- a) **Unsystematic Risk**
- b) **Systematic Risk**

Unsystematic Risk is an industry or firm-specific threat in each kind of investment. It is also known as “Specific Risk”, “Diversifiable risk” or “Residual Risk”. These are risks which are existing but are unplanned and can occur at any point in causing widespread disruption. For e.g., if the staff of the airline industry goes on an indefinite strike, then this will cause risk to the shares of the airline industry and fall in the prices of the stock impacting this industry.

Systematic Risk does not have a specific definition but is inherent risk existing in the stock market. These risks are applicable to all the sectors but can't be controlled. If there is an announcement or event which impacts the entire stock market, a consistent reaction will flow in which is a systematic risk. For e.g. if Government Bonds is offering a yield of 5% in comparison to the stock market which offers a minimum return of 10%. Suddenly, the government announces an additional tax burden of 1% on stock market transactions, this will be a systematic risk impacting all the stocks and may make the Government bonds more attractive.

Following are a few events that are source of systematic risk:

- Any major central bank action: reducing or raising policy rate, open market operations, etc.
- Bankruptcy of any institution critical to smooth functioning of financial market and economy. Let us say failure of another Lehman Brothers or AIG, etc.
- Wars, earth quakes, tsunamis, etc.
- Major fiscal policy changes such as new tax legislation, reduction or increase in tax rates and incidence.
- Major trade war or currency war.
- Inflation or hyperinflation

Types of Systematic Risk:

Market Risk

Market risk is caused by the herd mentality of investors, i.e. the tendency of investors to follow the direction of the market. Hence, market risk is the tendency of security prices to move together. If the market is declining, then even the share prices of good performing companies fall. Market risk constitutes almost two-thirds of total systematic risk. Therefore, sometimes the systematic risk is also referred to as market risk. Market price changes are the most prominent source of risk in securities.

Interest Rate Risk

Interest rate risk arises due to changes in market interest rates. In the stock market, this primarily affects fixed income securities because bond prices are inversely related to the market interest rate. In fact, interest rate risks include two opposite components: Price Risk and Reinvestment Risk. Both of these risks work in opposite directions. Price risk is associated with changes in the price of a security due to changes in interest rate. Reinvestment risk is associated with reinvesting interest/ dividend income. If price risk is negative (i.e., fall in price), reinvestment risk would be positive (i.e. increase in earnings on reinvested money). Interest rate changes are the main source of risk for fixed income securities such as bonds and debentures.

Purchasing Power Risk (or Inflation Risk)

Purchasing power risk arises due to inflation. Inflation is the persistent and sustained increase in the general price level. Inflation erodes the purchasing power of money, i.e., the same amount of money can buy fewer goods and services due to an increase in prices. Therefore, if an investor's income does not increase in times of rising inflation, then the investor is actually getting lower income in real terms. Fixed income securities are subject to a high level of purchasing power risk because income from such securities is fixed in nominal terms. It is often said that equity shares are good hedges against inflation and hence subject to lower purchasing power risk.

Exchange Rate Risk

In a globalized economy, most of the companies have exposure to foreign currency. Exchange rate risk is the uncertainty associated with changes in the value of foreign currencies. Therefore, this type of risk affects only the securities of companies with foreign exchange transactions or exposures such as export companies, MNCs, or companies that use imported raw material or products.

Total Risk (σ) = Systematic Risk (β) + Unsystematic Risk

Total risk is measured using the standard deviation while systematic risk is estimated by calculating beta coefficient.

The cost of equity using CAPM is computed as:

$$K_e = R_f + \beta (R_M - R_f)$$

Where,

K_e = Cost of equity

R_f = Expected Return on risk free security

R_m = Expected Return from the market

B = coefficient of systematic risk

Note: The Beta of a stock or portfolio measures the volatility of the instrument compared to the overall market volatility. It is used as a proxy for the systematic risk of the stock, and it can be used to measure how risky a stock is relative to the market risk. When used as a proxy to measure systematic risk, the β value of a portfolio can have the following interpretation.

- When $\beta = 0$ it suggests the portfolio/stock is uncorrelated with the market return.
- When $\beta < 0$ it suggests the portfolio/stock has an inverse correlation with the market return.
- When $0 < \beta < 1$ it suggests the portfolio/stock return is positively correlated with the market return however with smaller volatility.
- When $\beta = 1$ it suggests that the portfolio return has a perfect correlation with the market portfolio return.
- When $\beta > 1$ it suggests that the portfolio has a positive correlation with the market, but would have price movements of greater magnitude.

Example 7:

The risk-free rate equals four percent and the expected return on the market is ten percent. If a stock's expected return is 13 percent, what is the stock's beta?

$$K_e = R_f + \beta (R_M - R_f)$$

Putting the values in the above equation

$$13\% = 4\% + \beta(10\% - 4\%)$$

Beta = 1.5

Note: expected rate of return = cost of equity

Example 8:

As an investment manager you are supplied the following information:

Investment in equity	Initial price	dividend	Year end market price	Beta risk factor
K ltd	50	4	100	0.8
S ltd	70	4	120	0.7
J ltd	90	4	270	0.5
8% Govt bonds	1000	140	1010	1

You are required to calculate the expected rate of return (cost of equity) for each security using CAPM.

Please solve it and share the answer

iv. **Realised yield method**

This method removes the drawback which in the dividend yield method or earning yield method as both are based on future estimation of dividend or earning. There are many factors which can't be controlled and are very uncertain and if the risk is involved then the future planning can't be used and the decision related estimation return on investment can't be considered.

This approach is based on actual earning which is earned on the amount of investment. The equity share capital is calculated as:-

$$\text{Cost of equity share } (k_e) = (\text{Actual earning per share} / \text{market price per share}) * 100$$

According to this approach the realised yield is discounted by using present value factor and then compared with the present value of the investment.

Assumption: that the performance of an enterprise is consistent and therefore, it is a good indicator of future.

Example 9:

Mr. X, a shareholder of P & Co., purchased 5 shares at a cost of Rs. 260 on 1.1.2003. He retained the shares for 5 years and sold them on 1.1.2008 for Rs. 325.

The dividend which he received for the last five years are as under:

Years	Dividends Rs.
2003	15
2004	15
2005	16
2006	16
2007	16

Calculate the cost of equity capital.

Solution:

Before calculating the cost of equity capital, we are to compute the Internal Rate of Return (IRR) which can be calculated with the help of “**Trial and Error Method**” (as already discussed in capital budgeting).

The rate comes to 10% which is shown as:

Years	Dividends Rs.	Sale Proceeds Rs.	Discount Factors at 10%	Present Value
2003	15	—	0.909	13.63
2004	15	—	0.826	12.39
2005	16	—	0.751	12.02
2006	16	—	0.683	10.93
2007	16	—	0.621	9.94
2008	—	325	0.621	201.82
				<u>260.73</u>

Thus, the present value of cash flow as on Jan. 2008 amounts to Rs. 260.73 as against the purchase price of 5 shares of 1st Jan. 2003 which was Rs. 260. Therefore, at 10%, the PV of cash inflow will be equal to an outflow over a period of 5 years in the year 2003. As such, the cost of equity capital will be considered at 10%.

Example 10:

Mr J purchased 50 shares in a company at a cost of Rs. 2000 on 1.1.2008. he sold these shares on 1.1.2013 for Rs.2,520. The yearly dividends received by him in each of the years were as under:

Year	Dividend per share(Rs)
2008	121
2009	121
2010	141
2011	140
2012	152

Calculate the cost of equity capital.

Please solve it and share the answer.

v. Cost of Retained Earnings:

Generally, the companies do not distribute the entire profits by way of dividend among their shareholders. A part of such profits is retained for further expansion and development. It may lead to growth in both cash flow earnings and in dividends.

Retained earnings, like equity funds, have no accounting cost but do have an opportunity cost.

The opportunity cost of retained earnings is the dividend foregone by the shareholders. In other words, if the company retains cash flow, the equity shareholder foregoes the return he could have obtained if these funds were paid out. He receives higher dividends in future. Those projects which expected that extra future dividends at least cover these foregone opportunities should be financed by retained earnings.

As such, the **cost of equity reflects the return which shareholders would receive if cash flows were paid out by way of dividends.**

Thus, the cost of retained earnings is the earnings foregone by the shareholders, i.e., it is equal to the income what a shareholder could have earned otherwise by investing the same in an alternative investment.

For instance, if a shareholder could have invested the said funds in an alternative way they could have a return of, say, 12%. This return is actually foregone by them simply due to the fact that the company does not distribute the entire profits by way of dividend. In this case, the cost of retained earnings may be taken at 12%.

Case 1: cost of retained earnings when there is no floatation cost and no personal tax rate applicable for shareholders.

In this case the cost of retained earnings (k_r) is equal to the cost of equity because retained earnings are the earnings of the equity shareholders which they reinvest in the business itself. So the return they expect from the equity capital is the same return they'll expect from retained earnings.

$$K_r = K_e = D_1 / P_0 + g$$

Case 2: cost of retained earnings when there is floatation cost and personal tax rate applicable for shareholders.

Personal tax rate: the dividends receivable by the shareholders are subject to income tax.

Floatation/Brokerage cost: usually the shareholders have to incur some brokerage cost for investing the dividend received. Thus, the funds available with them for reinvestment will be reduced by this amount.

$$K_r = K_e(1-T)(1-f)$$

Example 11:

Annual Net Profit earned by a company amounted to Rs. 50,000. Shareholders' required rate of return is 10%. It is expected that retained earnings, if distributed among the shareholders can be invested by them in securities of similar type carrying return of 10% p.a. Shareholders also have to incur by way of brokerage and commission @ 3% of the net dividend received by them. Rate of tax is @ 40%.

Calculate the cost of retained earnings.

Solution:

Before calculating the cost of retained earnings it becomes necessary to calculate the net amounts which are available for investment by the shareholders and their expected rate of return which is calculated as:

	Rs.
Dividend Received	50,000
Less : Personal tax (income-tax @ 40%)	20,000
After-tax dividends	30,000
Less : Brokerage Costing @ 3%	900
Net amount available for investment.	<u>29,100</u>
Earnings of Investment Rs. 29,100 × $\frac{10}{100}$ = Rs. 2,910	

Now, if the net earnings has not been distributed by the company among the shareholders, the company could reinvest the full Rs. 50,000 instead of Rs. 29,100.

The rate of return to be earned on the retained earnings to the shareholders will be as:

$$\text{Rs. } 2,910 / \text{Rs. } 50,000 \times 100 = 5.82\%$$

Therefore, the rate of return expected by the shareholders on retained earnings is only 5.82%.

The same can also be calculated with the help of the above formula:

$$\begin{aligned} K_r &= K_e (1 - T)(1 - C) \\ &= .10(1 - .40)(1 - .03) \\ &= 5.82\% \end{aligned}$$

Example 12:

A Ltd is earning a net profit earned by a company amounted to Rs. 50,000 p.a. Shareholders' required rate of return is 10%. It is expected that retained earnings, if distributed among the shareholders can be invested by them in securities of similar type carrying return of 10% p.a. Shareholders also have to incur by way of brokerage and commission @ 2% of the net dividend received by them for making new investment. Rate of tax is @ 30%. Calculate the cost of retained earnings.

Please solve it and share the answer.

Limitation of this approach:

The fundamental difficulty in the above approach is to determine the personal tax rate of all the shareholders which will correctly reflect the opportunity cost of retained earnings to every shareholder. Personal tax rate will differ from shareholder to shareholder. In case of widely held public company there are a large number of shareholders. It is therefore, almost impossible to determine single tax rate.

iii. Capital Asset Pricing Model (CAPM) Approach:

Limitation of dividend and earning price method is that they do not consider the risk directly. The market price of the share that is considered in the earlier models reflect risk associated with a particular share. A less risky share will command a higher share price and hence a lower cost of equity capital. The expected return of a security is directly proportional to the degree of risk.

According to the CAPM approach, the return on security is determined by the degree of risk to which the security is exposed. It shows that the expected return on a security is equal to the risk-free return plus a risk premium, which is based on the beta of that security.

A security is exposed to two types of risk:

c) **Unsystematic Risk**

d) **Systematic Risk**

Unsystematic Risk is an industry or firm-specific threat in each kind of investment. It is also known as “Specific Risk”, “Diversifiable risk” or “Residual Risk”. These are risks which are existing but are unplanned and can occur at any point in causing widespread disruption. For e.g., if the staff of the airline industry goes on an indefinite strike, then this will cause risk to the shares of the airline industry and fall in the prices of the stock impacting this industry.

Systematic Risk does not have a specific definition but is inherent risk existing in the stock market. These risks are applicable to all the sectors but can't be controlled. If there is an announcement or event which impacts the entire stock market, a consistent reaction will flow in which is a systematic risk. For e.g. if Government Bonds is offering a yield of 5% in comparison to the stock market which offers a minimum return of 10%. Suddenly, the government announces an additional tax burden of 1% on stock market transactions, this will be a systematic risk impacting all the stocks and may make the Government bonds more attractive.

Following are a few events that are source of systematic risk:

- Any major central bank action: reducing or raising policy rate, open market operations, etc.
- Bankruptcy of any institution critical to smooth functioning of financial market and economy. Let us say failure of another Lehman Brothers or AIG, etc.
- Wars, earth quakes, tsunamis, etc.
- Major fiscal policy changes such as new tax legislation, reduction or increase in tax rates and incidence.
- Major trade war or currency war.
- Inflation or hyperinflation

Types of Systematic Risk:

Market Risk

Market risk is caused by the herd mentality of investors, i.e. the tendency of investors to follow the direction of the market. Hence, market risk is the tendency of security prices to move together. If the market is declining, then even the share prices of good performing companies fall. Market risk constitutes almost two-thirds of total systematic risk. Therefore,

sometimes the systematic risk is also referred to as market risk. Market price changes are the most prominent source of risk in securities.

Interest Rate Risk

Interest rate risk arises due to changes in market interest rates. In the stock market, this primarily affects fixed income securities because bond prices are inversely related to the market interest rate. In fact, interest rate risks include two opposite components: Price Risk and Reinvestment Risk. Both of these risks work in opposite directions. Price risk is associated with changes in the price of a security due to changes in interest rate. Reinvestment risk is associated with reinvesting interest/ dividend income. If price risk is negative (i.e., fall in price), reinvestment risk would be positive (i.e. increase in earnings on reinvested money). Interest rate changes are the main source of risk for fixed income securities such as bonds and debentures.

Purchasing Power Risk (or Inflation Risk)

Purchasing power risk arises due to inflation. Inflation is the persistent and sustained increase in the general price level. Inflation erodes the purchasing power of money, i.e., the same amount of money can buy fewer goods and services due to an increase in prices. Therefore, if an investor's income does not increase in times of rising inflation, then the investor is actually getting lower income in real terms. Fixed income securities are subject to a high level of purchasing power risk because income from such securities is fixed in nominal terms. It is often said that equity shares are good hedges against inflation and hence subject to lower purchasing power risk.

Exchange Rate Risk

In a globalized economy, most of the companies have exposure to foreign currency. Exchange rate risk is the uncertainty associated with changes in the value of foreign currencies. Therefore, this type of risk affects only the securities of companies with foreign exchange transactions or exposures such as export companies, MNCs, or companies that use imported raw material or products.

Total Risk (σ) = Systematic Risk (β) + Unsystematic Risk

Total risk is measured using the standard deviation while systematic risk is estimated by calculating beta coefficient.

The cost of equity using CAPM is computed as:

$$K_e = R_f + \beta (R_M - R_f)$$

Where,

K_e = Cost of equity

R_f = Expected Return on risk free security

R_m = Expected Return from the market

B = coefficient of systematic risk

Note: The Beta of a stock or portfolio measures the volatility of the instrument compared to the overall market volatility. It is used as a proxy for the systematic risk of the stock, and it can be used to measure how risky a stock is relative to the market risk. When used as a proxy to measure systematic risk, the β value of a portfolio can have the following interpretation.

- When $\beta = 0$ it suggests the portfolio/stock is uncorrelated with the market return.
- When $\beta < 0$ it suggests the portfolio/stock has an inverse correlation with the market return.
- When $0 < \beta < 1$ it suggests the portfolio/stock return is positively correlated with the market return however with smaller volatility.
- When $\beta = 1$ it suggests that the portfolio return has a perfect correlation with the market portfolio return.
- When $\beta > 1$ it suggests that the portfolio has a positive correlation with the market, but would have price movements of greater magnitude.

Example 7:

The risk-free rate equals four percent and the expected return on the market is ten percent. If a stock's expected return is 13 percent, what is the stock's beta?

$$K_e = R_f + \beta (R_M - R_f)$$

Putting the values in the above equation

$$13\% = 4\% + \beta(10\% - 4\%)$$

$$\text{Beta} = 1.5$$

Note: expected rate of return = cost of equity

Example 8:

As an investment manager you are supplied the following information:

Investment in equity	Initial price	dividend	Year end market price	Beta risk factor
K ltd	50	4	100	0.8
S ltd	70	4	120	0.7
J ltd	90	4	270	0.5
8% Govt bonds	1000	140	1010	1

You are required to calculate the expected rate of return (cost of equity) for each security using CAPM.

Please solve it and share the answer

iv. Realised yield method

This method removes the drawback which in the dividend yield method or earning yield method as both are based on future estimation of dividend or earning. There are many factors which can't be controlled and are very uncertain and if the risk is involved then the future planning can't be used and the decision related estimation return on investment can't be considered.

This approach is based on actual earning which is earned on the amount of investment. The equity share capital is calculated as:-

$$\text{Cost of equity share (k}_e\text{)} = (\text{Actual earning per share/market price per share}) * 100$$

According to this approach the realised yield is discounted by using present value factor and then compared with the present value of the investment.

Assumption: that the performance of an enterprise is consistent and therefore, it is a good indicator of future.

Example 9:

Mr. X, a shareholder of P & Co., purchased 5 shares at a cost of Rs. 260 on 1.1.2003. He retained the shares for 5 years and sold them on 1.1.2008 for Rs. 325.

The dividend which he received for the last five years are as under:

Years	Dividends
	Rs.
2003	15
2004	15
2005	16
2006	16
2007	16

Calculate the cost of equity capital.

Solution:

Before calculating the cost of equity capital, we are to compute the Internal Rate of Return (IRR) which can be calculated with the help of "Trial and Error Method" (as already discussed in capital budgeting).

The rate comes to 10% which is shown as:

Years	Dividends	Sale Proceeds	Discount Factors at 10%	Present Value
	Rs.	Rs.		
2003	15	—	0.909	13.63
2004	15	—	0.826	12.39
2005	16	—	0.751	12.02
2006	16	—	0.683	10.93
2007	16	—	0.621	9.94
2008	—	325	0.621	201.82
				<u>260.73</u>

Thus, the present value of cash flow as on Jan. 2008 amounts to Rs. 260.73 as against the purchase price of 5 shares of 1st Jan. 2003 which was Rs. 260. Therefore, at 10%, the PV of cash inflow will be equal to an outflow over a period of 5 years in the year 2003. As such, the cost of equity capital will be considered at 10%.

Example 10:

Mr J purchased 50 shares in a company at a cost of Rs. 2000 on 1.1.2008. he sold these shares on 1.1.2013 for Rs.2,520. The yearly dividends received by him in each of the years were as under:

Year	Dividend per share(Rs)
2008	121
2009	121
2010	141
2011	140
2012	152

Calculate the cost of equity capital.

Please solve it and share the answer.

D. Cost of Retained Earnings:

Generally, the companies do not distribute the entire profits by way of divided among their shareholders. A part of such profits is retained for further expansion and development. It may lead to growth in both cash flow earnings and in dividends.

Retained earnings, like equity funds, have no accounting cost but do have an opportunity cost.

The opportunity cost of retained earnings is the dividend foregone by the shareholders. In other words, if the company retains cash flow, the equity shareholder foregoes the return he could have obtained if these funds were paid out. He receives higher dividends in future.

Those projects which expected that extra future dividends at least cover these foregone opportunities should be financed by retained earnings.

As such, the **cost of equity reflects the return which shareholders would receive if cash flows were paid out by way of dividends.**

Thus, the cost of retained earnings is the earnings foregone by the shareholders, i.e., it is equal to the income what a shareholder could have earned otherwise by investing the same in an alternative investment.

For instance, if a shareholder could have invested the said funds in an alternative way they could have a return of, say, 12%. This return is actually foregone by them simply due to the fact that the company does not distribute the entire profits by way of dividend. In this case, the cost of retained earnings may be taken at 12%.

Case 1: cost of retained earnings when there is no floatation cost and no personal tax rate applicable for shareholders.

In this case the cost of retained earnings (k_r) is equal to the cost of equity because retained earnings are the earnings of the equity shareholders which they reinvest in the business itself. So the return they expect from the equity capital is the same return they'll expect from retained earnings.

$$K_r = K_e = D_1 / P_0 + g$$

Case 2: cost of retained earnings when there is floatation cost and personal tax rate applicable for shareholders.

Personal tax rate: the dividends receivable by the shareholders are subject to income tax.

Floatation/Brokerage cost: usually the shareholders have to incur some brokerage cost for investing the dividend received. Thus, the funds available with them for reinvestment will be reduced by this amount.

$$K_r = K_e(1-T)(1-f)$$

Example 11:

Annual Net Profit earned by a company amounted to Rs. 50,000. Shareholders' required rate of return is 10%. It is expected that retained earnings, if distributed among the shareholders can be invested by them in securities of similar type carrying return of 10% p.a. Shareholders also have to incur by way of brokerage and commission @ 3% of the net dividend received by them. Rate of tax is @ 40%.

Calculate the cost of retained earnings.

Solution:

Before calculating the cost of retained earnings it becomes necessary to calculate the net amounts which are available for investment by the shareholders and their expected rate of return which is calculated as:

	Rs.
Dividend Received	50,000
Less : Personal tax (income-tax @ 40%)	20,000
	30,000
After-tax dividends	30,000
Less : Brokerage Costing @ 3%	900
	29,100
Net amount available for investment.	29,100
Earnings of Investment Rs. 29,100 $\times \frac{10}{100} =$ Rs. 2,910	

Now, if the net earnings has not been distributed by the company among the shareholders, the company could reinvest the full Rs. 50,000 instead of Rs. 29,100.

The rate of return to be earned on the retained earnings to the shareholders will be as:

$$\text{Rs. } 2,910 / \text{Rs. } 50,000 \times 100 = 5.82\%$$

Therefore, the rate of return expected by the shareholders on retained earnings is only 5.82%.

The same can also be calculated with the help of the above formula:

$$\begin{aligned} K_r &= K_e (1 - T)(1 - C) \\ &= .10(1 - .40)(1 - .03) \\ &= 5.82\% \end{aligned}$$

Example 12:

A ltd is earning a net profit earned by a company amounted to Rs. 50,000 p.a. Shareholders' required rate of return is 10%. It is expected that retained earnings, if distributed among the shareholders can be invested by them in securities of similar type carrying return of 10% p.a. Shareholders also have to incur by way of brokerage and commission @ 2% of the net dividend received by them for making new investment. Rate of tax is @ 30%. Calculate the cost of retained earnings.

Please solve it and share the answer.

Limitation of this approach:

The fundamental difficulty in the above approach is to determine the personal tax rate of all the shareholders which will correctly reflect the opportunity cost of retained earnings to every shareholder. Personal tax rate will differ from shareholder to shareholder. In case of widely held public company there are a large number of shareholders. It is therefore, almost impossible to determine single tax rate.