COST OF CAPITAL(COC)

Cost of capital can be defined as the minimun rate of return which must be earned by the firm in order to fulfill the expectation of the investor.

Terminolgies in this context(notes given in physcal class while douing chapter 1)

Future COC, historical COC, Specific coc, average coc, implicit coc, explicit coc

SIGNIFICANCE OF COST OF CAPITAL

1. CAPITAL BUDGETING DECISIONS
2. CAPITAL STRUCTURE DECISION
3. EVALUATION OF PERFORMANCE OF TOP MANAGEMENT
4. DIVIDEND DECISION

PRIMARY COMPONENTS OF COST OF CAPITAL

We require to estimate the cost of all the components of capital structure. Hence we need to deduce , cost of debenture, cost of preference shares and cost of equity share capital.

debt capital is discussed below :

A. Cost of Irredeemable Debt Capital : When the value of a debt capital is not redeemed in any time other than the time of liquidation of the firm, the debt capital is called **Irredeemable Debt Capital.** It is also called **Perpetual Debt Capital.** In this case —

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

where, —

K_i = Before tax Cost of Debt ;

K_d = After tax Cost of Debt ;

It can be noted that if the before tax cost $\left(\frac{I}{P}\right)$ is multiplied by $(1 - t)$, then after tax cost is ascertained. This means, $K_d = \frac{I}{P}(1 - t)$ or, $K_d = K_i (1 - t)$.

I = Amount of Annual Interest ;

P = Net amount of realised from debt ; and

t = Rate of tax.

Example : X. Co. Ltd. issued 10,000 12% Irredeemable Debentures. The face value of each debenture is Rs. 100. The company is in the 45% tax bracket. Determine the before and after tax cost of debt if the debentures are issued (i) at par, (ii) at a premium @ 10% and (iii) at a discount @ 12%.

Solution ⇒

We know that—

$$K_i = \frac{I}{P} \quad \ldots\ldots\ldots\ldots (1)$$

and $$K_d = \frac{1}{P}(1 - t) \quad \ldots\ldots\ldots\ldots (2)$$

where,—

K_i = Before tax Cost of Debt.

K_d = After tax Cost of Debt.

I = Amount of Annual Interest $= \left(10{,}000 \times \text{Rs. } 100 \times \frac{12}{100}\right)$

= Rs. 1,20,000

t = Tax rate = 45% = 0.45.

P = Net amount realised from Debt.

(i) When the Debentures are issued at par :

In this case, P = 10,000 × Rs. 100 = Rs. 10,00,000.

By putting P = Rs. 10,00,000 and I = Rs. 1,20,000 in (1), we get—

$$K_i = \frac{1,20,000}{10,00,000} = 0.12 \text{ or, } 12\%$$

By putting P = Rs. 10,00,000 and I = Rs. 1,20,000 and t = 0.45 in (2), we get—

$$K_d = \frac{1,20,000}{10,00,000}(1 - 0.45)$$

$$\therefore K_d = \frac{1,20,000 \times 0.55}{10,00,000} = \frac{66,000}{10,00,000} = 0.066 = 6.6\%.$$

or, $K_d = K_i (1 - t) = 12\%(1 - 0.45) = 12\% \times 0.55 = 6.6\%$.

Hence, required before tax Cost of Debt is 12% and after tax Cost of Debt is 6.6%.

(ii) When the Debentures are issued at a premium @ 10% :

In this case, $P = 10,000 \times \text{Rs. } 100 \times \frac{110}{100} = \text{Rs. } 11,00,000.$

By putting P = Rs. 11,00,000, and I = Rs. 1,20,000 in (1), we get—

$$K_i = \frac{1,20,000}{11,00,000} = 0.1090 = 10.90\%.$$

By putting P = Rs. 11,00,000, I = Rs. 1,20,000 and t = 0.45 in (2), we get—

$$K_d = \frac{1,20,000}{11,00,000} \times (1 - 0.45) = \frac{1,20,000 \times 0.55}{11,00,000} = \frac{66,000}{11,00,000}$$

$$= 0.06 \text{ or, } 6\%.$$

or, $K_d = K_i (1 - t) = 10.90\% (1 - 0.45) = 10.90\% \times 0.55 = 5.995\%$ or, 6%.

Hence, required before tax Cost of Debt is 10.90% and after tax Cost of Debt is 6%.

(iii) When the Debentures are issued at a discount @ 12% :

In this case, $P = 10,000 \times \text{Rs. } 100 \times \frac{88}{100} = \text{Rs. } 8,80,000.$

By putting P = Rs. 8,80,000 and I = Rs. 1,20,000 in (1), we get—

$$K_i = \frac{1,20,000}{8,80,000} = 0.1364 \text{ or, } 13.64\%.$$

By putting P = Rs. 8,80,000, I = Rs. 1,20,000 and t = 0.45 in (2), we get—

$$K_d = \frac{1,20,000}{8,80,000}(1 - 0.45)$$

$$= \frac{1,20,000 \times 0.55}{8,80,000} = \frac{66,000}{8,80,000} = 0.075$$

$$= 7.5\%.$$

or, $K_d = K_i (1 - t) = 13.64\% (1 - 0.45) = 13.64\% \times 0.55 = 7.5\%$.

Hence, required before tax Cost of Debt is 13.64% and after tax Cost of Debt is 7.5%.

B. Cost of redeemable Debt Capital : When the value of a debt capital is redeemed after a certain period of time according to the terms of issue, the debt capital is called **Redeemable Debt Capital**. In this case, the cost of such type of Debt Capital, —

$$K_i = \frac{I + \frac{(R - P)}{n}}{\frac{(R + P)}{2}} \text{ and } K_d = \left[\frac{I + \frac{(R - P)}{n}}{\frac{(R + P)}{2}}\right](1 - t)$$

where, —

K_i = Before tax Cost of Debt Capital ;

K_d = After tax Cost of Debt Capital ;

It can be noted that in this regard that if the before tax cost is multiplied by (1 – t), then the after tax cost is ascertained, i.e., $K_d = K_i (1 - t)$

I = Amount of annual interest ;

R = Redeemable price ;

P = Net amount realised from Debt ;

n = Time period of redemption of Debt ; and

t = Rate of tax.

It can be mentioned in this regard that if the realised amount from a debt is equivalent to its redeemable price, then the cost of redeemable debt capital is to be determined in the same way as irredeemable debt capital. For example—we know that the cost of redeemable debt capital $K_d = \left[\frac{I + \frac{(R - P)}{n}}{\left(\frac{R + P}{2}\right)}\right](1 - t)$.

Now, if redeemable price (R) = Amount realised from debt (P), then —

$$K_d = \left[\frac{I + \frac{(P - P)}{n}}{\frac{P + P}{2}}\right](1 - t)$$

or, $K_d = \left[\frac{I}{\frac{2P}{2}}\right](1 - t)$

or, $K_d = \frac{I}{P}(1 - t)$ = Cost of irredeemable debt capital.

Example : 1. A company issues Rs. 4,00,000 8% Redeemable Debenture at a discount of 10%. The cost of floatation amounts to Rs. 20,000. The debentures are redeemable at a premium @ 10% after 5 years. If the tax rate is 40%, calculate the cost of Debt.

Solution ⇒

Face value of the Debentures	= Rs. 4,00,000
Less : Discount on issue $\left[\text{Rs. } 4,00,000 \times \frac{10}{100}\right]$	= Rs. 40,000
	Rs. 3,60,000
Less : Floatation cost	Rs. 20,000
Net amount realised from the Debenture (P)	= Rs. 3,40,000
Face value of the Debenture	= Rs. 4,00,000
Add : Premium payable on redemption $\left[\text{Rs. } 4,00,000 \times \frac{10}{100}\right]$	= Rs. 40,000
Redeemable price (R)	= Rs. 4,40,000

I = Amount of annual interest = Rs. $4,00,000 \times \frac{8}{100}$ = Rs. 32,000.

t = Tax rate = 40% or, 0.40.

n = Time period of redemption of Debt = 5 years.

Now, if K_i be the before tax Cost of Debt, then—

$$K_i = \frac{I + \frac{(R - P)}{n}}{\frac{(R + P)}{2}}$$

$$= \frac{32,000 + \frac{(4,40,000 - 3,40,000)}{5}}{\frac{(4,40,000 + 3,40,000)}{2}}$$

$$= \frac{32,000 + \frac{1,00,000}{5}}{\frac{7,80,000}{2}}$$

$$= \frac{32,000 + 20,000}{3,90,000}$$

$$= \frac{52,000}{3,90,000} = 0.1333 \text{ or, } 13.33\%.$$

Again, if K_d be the after tax Cost of Debt, then—

$$K_d = \left[\frac{1 + \frac{(R - P)}{n}}{\frac{(R + P)}{2}}\right](1 - t) = \left[\frac{32,000 + \frac{(4,40,000 - 3,40,000)}{5}}{\frac{(4,40,000 + 3,40,000)}{2}}\right](1 - 0.40)$$

$$= \left[\frac{32,000 + \frac{1,00,000}{5}}{\frac{4,40,000 + 3,40,000}{2}}\right] 0.60 = \frac{(32,000 + 20,000)}{3,90,000} \times 0.60$$

$$= \frac{52,000 \times 0.60}{3,90,000} = 0.08 \text{ or, } 8\%.$$

or, $K_d = K_i (1 - t) = 13.33\% (1 - 0.40)$

$= 13.33\% \times 0.60 = 7.998\%$ or, 8%.

Hence, required before tax Cost of Debt is 13.33% and after tax Cost of Debt is 8%.