

ILLUSTRATION 17

CALCULATE the WACC using the following data by using:

- (a) Book value weights
(b) Market value weights

The capital structure of the company is as under:

	(₹)
Debtures (₹ 100 per debture)	5,00,000
Preference shares (₹ 100 per share)	5,00,000
Equity shares (₹ 10 per share)	10,00,000
	20,00,000

The market prices of these securities are:

- Debtures ₹ 105 per debture
Preference shares ₹ 110 per preference share
Equity shares ₹ 24 per equity share

Additional information:

- (1) ₹ 100 per debture redeemable at par, 10% coupon rate, 4% floatation costs, 10-year maturity.
- (2) ₹ 100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10-year maturity.
- (3) Equity shares has ₹ 4 floatation cost and market price of ₹ 24 per share.

The next year expected dividend is ₹ 1 with annual growth of 5%. The firm has practice of paying all earnings in the form of dividend.

Corporate tax rate is 30%. Use YTM method to calculate cost of debtures and preference shares.

ILLUSTRATION 18

ABC Ltd. has the following capital structure, which is considered to be optimum as on 31st March, 2023.

	(₹)
14% Debentures	30,000
11% Preference shares	10,000
Equity Shares (10,000 shares)	1,60,000
	2,00,000

The company share has a market price of ₹ 23.60. Next year dividend per share is 50% of year 2022 EPS. Following is the uniform trend of EPS for the preceding 10 years which is expected to continue in future:

Year	EPS (₹)	Year	EPS (₹)
2013	1.00	2018	1.61
2014	1.10	2019	1.77
2015	1.21	2020	1.95
2016	1.33	2021	2.15
2017	1.46	2022	2.36

The company issued new debentures carrying 16% rate of interest and the current market price of debenture is ₹ 96.

Preference shares of ₹ 9.20 (with annual dividend of ₹ 1.1 per share) were also issued. The company is in 50% tax bracket.

(A) CALCULATE after tax:

- (i) Cost of new debt
- (ii) Cost of new preference shares
- (iii) Cost of new equity share (assuming new equity from retained earnings)

(B) CALCULATE marginal cost of capital when no new shares are issued.

(C) DETERMINE the amount that can be spent for capital investment before new ordinary shares must be sold. Assuming that the retained earnings for next year's investment is 50 percent of 2022.

(D) COMPUTE marginal cost of capital when the fund exceeds the amount calculated in (C), assuming new equity is issued at ₹ 20 per share.

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4. Masco Limited wishes to raise additional finance of ₹ 10 lakhs for meeting its investment plans. It has ₹ 2,10,000 in the form of retained earnings available for investment purposes. Further details are as following:

(1)	Debt / Equity mix	3:7
(2)	Cost of debt:	
	Upto ₹ 1,80,000	10% (before tax)
	Beyond ₹ 1,80,000	16% (before tax)
(3)	Earnings per share	₹ 4
(4)	Dividend pay out	50% of earnings
(5)	Expected growth rate of dividend	10%
(6)	Current market price per share	₹ 44
(7)	Tax rate	50%

You are required to:

- DETERMINE the pattern for raising the additional finance.
 - DETERMINE the post-tax average cost of additional debt.
 - DETERMINE the cost of retained earnings and cost of equity.
 - COMPUTE the overall weighted average after tax cost of additional finance.
5. DETERMINE the cost of capital of Best Luck Limited using the book value (BV) and market value (MV) weights from the following information:

Sources	Book Value (₹)	Market Value (₹)
Equity shares	1,20,00,000	2,00,00,000
Retained earnings	30,00,000	-
Preference shares	36,00,000	33,75,000
Debentures	9,00,000	10,40,000

Additional information:

- Equity: Equity shares are quoted at ₹130 per share and a new issue priced at ₹125 per share will be fully subscribed; flotation costs will be ₹ 5 per share.
 - Dividend: During the previous 5 years, dividends have steadily increased from ₹ 10.60 to ₹ 14.19 per share. Dividend at the end of the current year is expected to be ₹ 15 per share.
 - Preference shares: 15% Preference shares with face value of ₹ 100 would realise ₹105 per share.
 - Debentures: The company proposes to issue 11-year 15% debentures but the yield on debentures of similar maturity and risk class is 16%; flotation cost is 2%.
 - Tax: Corporate tax rate is 35%. Ignore dividend tax.
- Flotation cost would be calculated on face value.

7. A company issues:

- 15% convertible debentures of ₹ 100 each at par with a maturity period of 6 years. On maturity, each debenture will be converted into 2 equity shares of the company. The risk-free rate of return is 10%, market risk premium is 18% and beta of the company is 1.25. The company has paid dividend of ₹ 12.76 per share. Five years ago, it paid dividend of ₹ 10 per share. Flotation cost is 5% of issue amount.
- 5% preference shares of ₹ 100 each at premium of 10%. These shares are redeemable after 10 years at par. Flotation cost is 6% of issue amount.

Assuming corporate tax rate is 40%.

(i) CALCULATE the cost of convertible debentures using the approximation method.

(ii) Use YTM method to CALCULATE cost of preference shares.

Year	1	2	3	4	5	6	7	8	9	10
PVIF _{0.03, t}	0.971	0.943	0.915	0.888	0.863	0.837	0.813	0.789	0.766	0.744
PVIF _{0.05, t}	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614
PVIFA _{0.03, t}	0.971	1.913	2.829	3.717	4.580	5.417	6.230	7.020	7.786	8.530
PVIFA _{0.05, t}	0.952	1.859	2.723	3.546	4.329	5.076	5.786	6.463	7.108	7.722

Interest rate	1%	2%	3%	4%	5%	6%	7%	8%	9%
FVIF _{i, 5}	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539
FVIF _{i, 6}	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677
FVIF _{i, 7}	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828

Question 6

XYZ Ltd. has the following book value capital structure:

Equity Capital (in shares of ₹ 10 each, fully paid up- at par)	₹ 15 crores
11% Preference Capital (in shares of ₹ 100 each, fully paid up- at par)	₹ 1 crore
Retained Earnings	₹ 20 crores
13.5% Debentures (of ₹ 100 each)	₹ 10 crores
15% Term Loans	₹ 12.5 crores

The next expected dividend on equity shares per share is ₹ 3.60; the dividend per share is expected to grow at the rate of 7%. The market price per share is ₹ 40.

Preference stock, redeemable after ten years, is currently selling at ₹ 75 per share.

Debentures, redeemable after six years, are selling at ₹ 80 per debenture.

The Income tax rate for the company is 40%.

(i) Required

Calculate the current weighted average cost of capital using:

- (a) book value proportions; and
- (b) market value proportions.

(ii) Define the weighted marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:

- (a) the amount will be raised by equity and debt in equal proportions;
- (b) the company expects to retain ₹ 1.5 crores earnings next year;
- (c) the additional issue of equity shares will result in the net price per share being fixed at ₹ 32;
- (d) the debt capital raised by way of term loans will cost 15% for the first ₹ 2.5 crores and 16% for the next ₹ 2.5 crores.

SOLUTION :

- (i) (a) Statement showing computation of weighted average cost of capital by using Book value proportions

Source of finance	Amount (Book value) (₹ in crores)	Weight (Book value proportion) (a)	Cost of capital (%) (b)	Weighted cost of capital (%) (c) = (a)x(b)
Equity capital (W.N.1)	15.00	0.256	16.00	4.096
11% Preference capital (W.N.2)	1.00	0.017	15.43	0.262
Retained earnings (W.N.1)	20.00	0.342	16.00	5.472
13.5% Debentures (W.N.3)	10.00	0.171	12.70	2.171
15% term loans (W.N.4)	12.50	0.214	9.00	1.926
	58.50	1.000		13.927

- (b) Statement showing computation of weighted average cost of capital by using market value proportions

Source of finance	Amount (₹ in crores)	Weight (Market value proportions) (a)	Cost of capital (%) (b)	Weighted cost of capital (%) (c) = (a) x (b)
Equity capital (W.N.1)	60.00 (1.5 crores x ₹ 40)	0.739	16.00	11.824
11% Preference capital (W.N.2)	0.75 (1 lakh x ₹ 75)	0.009	15.43	0.138
13.5% Debentures (W.N.3)	8.00 (10 lakhs x ₹ 80)	0.098	12.70	1.245
15% Term loans (W.N.4)	12.50	0.154	9.00	1.386
15% Term loans (W.N.4)	12.50	0.154	9.00	1.386
	81.25	1.00		14.593

[Note: Since retained earnings are treated as equity capital for purposes of calculation of cost of specific source of finance, the market value of the ordinary shares may be taken to represent the combined market value of equity shares and retained earnings. The separate market values of retained earnings and ordinary shares may also be worked out by allocating

to each of these a percentage of total market value equal to their percentage share of the total based on book value.]

Working Notes (W.N.):

1. Cost of equity capital and retained earnings (K_e)

$$K_e = \frac{D_1}{P_0} + g$$

Where, K_e = Cost of equity capital

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of equity share

g = Growth rate of dividend

Now, it is given that $D_1 = ₹ 3.60$, $P_0 = ₹ 40$ and $g = 7\%$

$$\text{Therefore, } K_e = \frac{₹ 3.60}{₹ 40} + 0.07$$

$$\text{or } K_e = 16\%$$

2. Cost of preference capital (K_p)

$$K_p = \frac{PD + \left[\frac{RV - NP}{n} \right]}{\frac{RV + NP}{2}}$$

Where, PD = Preference dividend

RV = Redeemable value of preference shares

NP = Current market price of preference shares

n = Redemption period of preference shares

Now, it is given that $PD = 11\%$, $RV = ₹ 100$, $NP = ₹ 75$ and $n = 10$ years

$$\text{Therefore } K_p = \frac{₹ 11 + \left[\frac{₹ 100 - ₹ 75}{10} \right]}{\left[\frac{₹ 100 + ₹ 75}{2} \right]} \times 100 = 15.43 \%$$

3. Cost of debentures (K_d)

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

Where, I = Interest payment
 t = Tax rate applicable to the company
 RV = Redeemable value of debentures
 NP = Current market price of debentures
 n = Redemption period of debentures

Now it is given that I = 13.5, t = 40%, RV = ₹ 100, NP = ₹ 80 and n = 6 years

$$\text{Therefore, } K_d = \frac{₹13.5(1-0.40) + \left[\frac{₹ 100 - ₹ 80}{6} \right]}{\left[\frac{₹ 100 + ₹ 80}{2} \right]} \times 100 = 12.70\%$$

4. Cost of Term loans (K_t)

$$K_t = r(1-t)$$

Where, r = Rate of interest on term loans
 t = Tax rate applicable to the company

Now, r = 15% and t = 40%

Therefore, $K_t = 15\% (1 - 0.40) = 9\%$

(ii) Statement showing weighted marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:

Source of finance	Amount (₹ in crores)	Weight (a)	After tax Cost of capital (%) (b)	Weighted Average cost of capital (%) (c) = (a) x (b)
Equity shares (W.N.5)	3.5	0.35	18.25	6.387
Retained earnings	1.5	0.15	18.25	2.737
15% Debt (W.N.6)	2.5	0.25	9.00	2.250
16% of Debt (W.N.6)	2.5	0.25	9.60	2.400
	10.0	1.00		13.774

Working Notes (W.N.):

5. Cost of equity share (K_e) (including fresh issue of equity shares)

$$K_e = \frac{D_1}{P_0} + g$$

Now, $D_1 = ₹ 3.60$, $P_0 = ₹ 32$ and $g = 0.07$

$$\text{Therefore, } K_e = \left[\frac{₹ 3.60}{₹ 32} \right] + 0.07 = 18.25\%$$

6. Cost of debt (K_d) = $r(1-t)$

(For first ₹ 2.5 crores)

r = 15% and t = 40%

Therefore, $K_d = 15\% (1 - 40\%) = 9\%$

(For the next 2.5 crores)

r = 16% and t = 40%

Therefore, $K_d = 16\% (1 - 40\%) = 9.6\%$

Question 9

The R&G Ltd. has following capital structure at 31st December 2015, which is considered to be optimum:

	(₹)
13% Debenture	3,60,000
11% Preference share capital	1,20,000
Equity share capital (2,00,000 shares)	19,20,000

The company's share has a current market price of ₹ 27.75 per share. The expected dividend per share in next year is 50 percent of the 2015 EPS. The EPS of last 10 years is as follows. The past trends are expected to continue:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EPS (₹)	1.00	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773

The company can issue 14 percent new debenture. The company's debenture is currently selling at ₹ 98. The new preference issue can be sold at a net price of ₹ 9.80, paying a dividend of ₹ 1.20 per share. The company's marginal tax rate is 50%.

- (i) Calculate the after tax cost (a) of new debts and new preference share capital, (b) of ordinary equity, assuming new equity comes from retained earnings.
- (ii) Calculate the marginal cost of capital.
- (iii) How much can be spent for capital investment before new ordinary share must be sold? (Assuming that retained earnings available for next year's investment is 50% of 2015 earnings.)
- (iv) What will be marginal cost of capital (cost of fund raised in excess of the amount calculated in part (ii) if the company can sell new ordinary shares to net ₹ 20 per share? The cost of debt and of preference capital is constant.

Answer

(i) Calculation of after tax cost of the followings:

$$(a) \text{ New 14\% Debentures } (K_d) = \frac{I(1-t)}{NP} = \frac{₹14(1-0.5)}{₹98} = 0.0714 \text{ or } 7.14\%$$

$$\text{New 12\% Preference Shares } (K_p) = \frac{PD}{NP} = \frac{₹1.20}{₹9.80} = 0.1224 \text{ or } 12.24\%$$

$$(b) \text{ Equity Shares (Retained Earnings) } (K_e) = \frac{\text{Expected dividend } (D_1)}{\text{Current market price } (P_0)} + \text{Growthrate } (G)$$

$$= \frac{50\% \text{ of } ₹2.773}{₹27.75} + 0.12 = 0.17 \text{ or } 17\%$$

* Growth rate (on the basis of EPS) is calculated as below :

$$\frac{\text{EPS in current year} - \text{EPS in previous year}}{\text{EPS in previous year}} = \frac{₹2.773 - ₹2.476}{₹2.476} = 0.12$$

(Students may verify the growth trend by applying the above formula to last three or four years)

(ii) Calculation of marginal cost of capital (on the basis of existing capital structure):

Source of capital	Weight (a)	After tax Cost of capital (%) (b)	WACC (%) (a) × (b)
14% Debenture	0.15	7.14	1.071
12% Preference shares	0.05	12.24	0.612
Equity shares	0.80	17.00	13.600
Marginal cost of capital			15.283

(iii) The company can spent for capital investment before issuing new equity shares and without increasing its marginal cost of capital:

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Retained earnings can be available for capital investment

= 50% of 2015 EPS × equity shares outstanding

= 50% of ₹ 2.773 × 2,00,000 shares = ₹ 2,77,300

Since, marginal cost of capital is to be maintained at the current level i.e. 15.28%, the retained earnings should be equal to 80% of total additional capital for investment.

Thus investment before issuing equity $\left(\frac{₹ 2,77,300}{80} \times 100 \right) = ₹ 3,46,625$

The remaining capital of ₹ 69,325 i.e. ₹ 3,46,625 – ₹ 2,77,300 shall be financed by issuing 14% Debenture and 12% preference shares in the ratio of 3 : 1 respectively.

- (iv) If the company spends more than ₹ 3,46,625 as calculated in part (iii) above, it will have to issue new shares at ₹ 20 per share.

The cost of new issue of equity shares will be:

$$K_e = \frac{\text{Expected dividend (D}_1\text{)}}{\text{Current market price (P}_0\text{)}} + \text{Growth rate (g)} = \frac{50\% \text{ of } ₹ 2.773}{₹ 20} + 0.12 = 0.1893 \text{ or } 18.93\%$$

Calculation of marginal cost of capital (assuming the existing capital structure will be maintained):

Source of capital	Weight (a)	Cost (%) (b)	WACC (%) (a) × (b)
14% Debenture	0.15	7.14	1.071
12% Preference shares	0.05	12.24	0.612
Equity shares	0.80	18.93	15.144
Marginal cost of capital			16.827