

## 9. DIVIDEND DECISIONS

## ASSIGNMENT SOLUTIONS

MODEL 1: WALTER MODELPROBLEM NO. 1

Market Price (P) per share as per Walter's Model is:

$$P = \frac{D + \frac{r}{k_e} (E - D)}{k_e}$$

Where,

P = Price of Share

r = Return on investment or rate of earning

Ke = Rate of Capitalisation or Cost of Equity

Calculation of Market Price (P) under the following dividend payout ratio and earning rates:

	Rate of Earning (r)	(i)	(ii)	(iii)
		DP ratio 50%	DP ratio 75%	DP ratio 100%
(a)	15%	$5 + \frac{0.15}{0.10} (10 - 5)$ 0.10	$7.5 + \frac{0.15}{0.10} (10 - 7.5)$ 0.10	$10 + \frac{0.15}{0.10} (10 - 10)$ 0.10
		$= \frac{12.5}{0.10} = 125$	$= \frac{11.25}{0.10} = 112.5$	$= \frac{10}{0.10} = 100$
(b)	10%	$5 + \frac{0.10}{0.10} (10 - 5)$ 0.10	$7.5 + \frac{0.10}{0.10} (10 - 7.5)$ 0.10	$10 + \frac{0.10}{0.10} (10 - 10)$ 0.10
		$= \frac{10}{0.10} = 100$	$= \frac{10}{0.10} = 100$	$= \frac{10}{0.10} = 100$
(c)	5%	$5 + \frac{0.5}{0.10} (10 - 5)$ 0.10	$7.5 + \frac{0.5}{0.10} (10 - 7.5)$ 0.10	$10 + \frac{0.5}{0.10} (10 - 10)$ 0.10
		$= \frac{7.5}{0.10} = 75$	$= \frac{8.75}{0.10} = 87.5$	$= \frac{10}{0.10} = 100$

PROBLEM NO. 2

- The EPS of the firm is Rs. 10 (i.e., Rs. 2,00,000/ 20,000).
- The P/E Ratio is given at 12.5 and the cost of capital,  $k_e$ , may be taken at the inverse of P/E ratio. Therefore,  $k_e$  is 8 (i.e., 1/12.5).
- The firm is distributing total dividends of Rs. 3,20,000 among 40,000 shares, giving a dividend per share of Rs. 8.

(i) Value of the share as per Walter's model may be found as follows

$$P = \frac{D + \frac{r}{k_e} (E - D)}{k_e}$$

Where,

P = Price of Share

r = Return on investment or rate of earning

Ke = Rate of Capitalisation or Cost of Equity

$$P = \frac{8 + \frac{0.1}{0.08} (10 - 8)}{0.08}$$

$$P = 131.25$$

(ii) The optimum payout ratio is Zero, since  $r > ke$

Therefor D/P ratio is not optimum

(iii) The P/E ratio at which the dividend policy will have no effect on the value of the shares is such at which the  $ke$  would be equal to the rate of return,  $r$ , of the firm. The  $ke$  would be 10% at the P/E ratio of 10. Therefore, at the P/E ratio of 10% the dividend policy would have no effect on the value of the share.

### **PROBLEM NO 3:**

(i) value of the share as per Walter's model may be found as follows

$$P = \frac{D + \frac{r}{k_e} (E - D)}{k_e}$$

Where,

P = Price of Share

r = Return on investment or rate of earning

Ke = Rate of Capitalisation or Cost of Equity

$$P = \frac{3 + \frac{0.15}{0.12} (5 - 3)}{0.12}$$

$$= 45.83$$

(ii) The optimum payout ratio is Zero, since  $r > ke$

Optimum Pay-out ratio

$$P = \frac{0 + \frac{0.15}{0.12} (5 - 0)}{0.12} = 52.08$$

(iii) Payout ratio to keep Share price at Rs.50.

Let, the dividend pay-out ratio be X and so the share price will be:

$$50 = \frac{D + \frac{0.15}{0.12} (5 - D)}{0.12}$$

$$D = 1$$

$$\text{Payout ratio} = 1/5 = 20\%$$

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**MODEL 2: GORDON'S MODEL****PROBLEM NO 4:**

Price per share according to Gordon's Model is calculated as follows:

$$P = \frac{E_1(1-b)}{K_e - br}$$

$$E = 10$$

$$K_e = 10 \%$$

	Pay-out ratio ( 30%)	Pay-out ratio ( 60%)	Pay-out ratio ( 80%)
If $r = 15\%$	$= \frac{10(0.3)}{0.10 - (0.7)(0.15)}$ = 60	$= \frac{10(0.6)}{0.10 - (0.4)(0.15)}$ = 150	$= \frac{10(0.8)}{0.10 - (0.2)(0.15)}$ = 114.29
If $r = 10\%$	$= \frac{10(0.3)}{0.10 - (0.7)(0.1)}$ = 100	$= \frac{10(0.6)}{0.10 - (0.4)(0.1)}$ = 100	$= \frac{10(0.8)}{0.10 - (0.2)(0.1)}$ = 100
If $r = 12\%$	$= \frac{10(0.3)}{0.10 - (0.7)(0.12)}$ = 187.5	$= \frac{10(0.6)}{0.10 - (0.4)(0.12)}$ = 115.38	$= \frac{10(0.8)}{0.10 - (0.2)(0.12)}$ = 105.26

**PROBLEM NO 5:**

In this case the company has paid dividend of Rs. 10 per share during the last year. The growth rate (g) is 10%. Then, the current year dividend (D1) with the expected growth rate of 10% will be Rs. 11

$$\text{The share price is } P_0 = \frac{D_1}{k_e - g}$$

$$= \frac{11}{0.2 - 0.1} = 110$$

(i) In case the growth rate rises to 12% then the dividend for the current year (D1) would be Rs. 11.2 and market price would be-

$$= \frac{11.2}{0.2 - 0.12} = 140$$

(ii) In case growth rate falls to 8% then the dividend for the current year (D1) would be Rs. 10.8 and market price would be-

$$= \frac{10.8}{0.2 - 0.08} = 90$$

**PROBLEM NO 6:**

(i) According to Dividend Discount Model approach the firm's expected or required return on equity is computed as follows:

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

$$= \frac{50}{500} + 0.01 = 20\%$$

(ii) With rate of return on retained earnings (r) 10% and retention ratio (b) 60%, new growth rate will be as follows:

$$\begin{aligned} &= g = br \\ &= 0.20 \times 0.30 = 0.06 = 6\% \end{aligned}$$

Accordingly dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b1) and then EPS assuming that rate of return on retained earnings (r) is same.

With previous Growth Rate of 10% and r = 20% the retention ratio comes out to be:

$$0.01 = b_1 \times 0.20$$

$$b_1 = 0.5 \text{ and payout ratio} = 0.5$$

With 0.5 payout ratio the EPS will be as follows:

$$\frac{50}{0.5} = 100$$

With new 0.70 (1 - 0.30) payout ratio the new dividend will be

$$D_1 = 100 \times 0.70 = 70$$

Accordingly new Ke will be

$$Ke = \frac{70}{500} + 6.0\% = 20\%$$

### **PROBLEM NO 7:**

Price per share according to Gordon's Model is calculated as follows:

$$P_0 = \frac{E(1-b)}{k - br}$$

p0 = Present value of market price per share

E = Earnings per share

K = Cost of capital

b = retention ratio

r = IRR

br = Growth rate

$$P_0 = \frac{12(1-0.4)}{0.18 - (0.4 \times 0.22)}$$

$$= \frac{7.2}{0.092} = \text{Rs.} 78.26$$

Price per share according to Walter's Model is calculated as follows:

$$V_e = \frac{D + \frac{R_a}{R_e}(E - D)}{R_e}$$

Ve = Market price

D = Dividend per share

R<sub>a</sub> = IRR

R<sub>e</sub> = Cost of capital

E = Earning per share

$$= \frac{3 + \frac{0.22}{0.18} (12 - 3)}{0.18} = \text{Rs. 77.77}$$

### **MODEL 3: GRAHAM & DODD**

#### **PROBLEM NO 8:**

As per graham & Dood model

$$P = m(D + E/3)$$

$$116.66 = 7(10 + E/3)$$

$$E = 20$$

### **MODEL 4: LINTNER'S MODEL**

#### **PROBLEM NO 9:**

$$D_1 = D_0 + af [(E \times TP) - D_0]$$

$$28 = 24 + 0.6 (E \times 0.4 - 24)$$

$$4/0.6 + 24 = E \times 0.4$$

$$E = 76.67$$

$$\text{PE Multiple} = 9$$

$$\text{Market Capitalization} = 76.67 \times 9 \times 5,00,000 = 34,50,000$$

### **MODEL 5: MODIGLIANI AND MILLER MODEL**

#### **PROBLEM NO 10:**

Given,

Cost of Equity (K <sub>e</sub> )	9.6%
Number of shares in the beginning (n)	8,00,000
Current Market Price (P <sub>0</sub> )	Rs.120
Net Profit (E)	Rs.1,60,00,000
Expected Dividend	Rs.6.4 per share
Investment (I)	Rs.3,20,00,000

$$(i) P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 6.4}{1 + 0.096}$$

$$P_1 = 131.52 - 6.4 = 125.12$$

$$(ii) P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 0}{1 + 0.096}$$

$$P_1 = 131.52 - 0 = 131.52$$

(iii) Calculation of funds required for investment

Earning	1,60,00,000
Dividend distributed	51,20,000
Fund available for investment	1,08,80,000
Total Investment	3,20,00,000
Balance Funds required	3,20,00,000 - 1,08,80,000 = Rs. 2,11,20,000

$$\text{No of shares} = \frac{\text{funds required}}{\text{price at the end}(P_1)}$$

$$\Delta n = \frac{2,11,20,000}{125.12} = 1,68,797.95 \text{ or } 1,68,798 \text{ share}$$

$$(iv) = \frac{1,60,00,000}{131.52} = 1,21,655 \text{ Shares}$$

### PROBLEM NO 11

Given,

Cost of Equity (Ke)	10%
Number of shares in the beginning (n)	10,000
Current Market Price (P0)	Rs.100
Net Profit (E)	Rs.1,00,000
Expected Dividend	Rs.5 per share
Investment (I)	Rs.2,00,000

Case 1 - When dividends are paid

**Step 1**

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 5}{1 + 0.10}$$

$$P_1 = 110 - 5 = 105$$

**Step 2**

Calculation of funds required for investment:

Earnings	1,00,000
Dividend Distributed	50,000
Retained Earnings	50,000
Total Amount require for Investment	2,00,000
Retained Earnings	50,000
Balance funds required through fresh issue	1,50,000

**Step 3**

No. of shares required to be issued for balance fund

$$\text{No of shares} = \frac{\text{funds required}}{\text{price at the end}(P_1)}$$

Case 2 – When dividends are not paid

**Step 1**

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 0}{1 + 0.10}$$

$$P_1 = 110 - 0 = 110$$

**Step 2**

Calculation of funds required for investment:

Earnings	1,00,000
Dividend Distributed	NIL
Retained Earnings	1,00,000
Total Amount required for Investment	2,00,000
Retained Earnings	1,00,000
Balance funds required through fresh issue	1,00,000

**Step 3**

No. of shares required to be issued for balance fund

$$\text{No of shares} = \frac{\text{funds required}}{\text{price at the end}(P_1)}$$

$\Delta n = \frac{1,50,000}{105} = 1,428.57$	$\Delta n = \frac{1,00,000}{110} = 909.09$
<b>Step 4</b>	<b>Step 4</b>
<b>Calculation of value of firm</b>	<b>Calculation of value of firm</b>
$V_f = \frac{(n + \Delta n)P - I + E}{1 + K_e}$ $V_f = \frac{\left(10,000 + \frac{1,50,000}{105}\right)105 - 200,000 + 1,00,000}{(1 + 0.10)}$ $= \text{Rs. } 10,00,000$	$V_f = \frac{(n + \Delta n)P - I + E}{1 + K_e}$ $V_f = \frac{\left(10,000 + \frac{1,00,000}{110}\right)110 - 200,000 + 1,00,000}{(1 + 0.10)}$ $= \text{Rs. } 10,00,000$

## **MODEL 6: BUY BACK OR STOCK REPURCHASE**

### **PROBLEM NO 12**

i) Let be the buyback price decided by Rahul Ltd.

market capitalisation after buyback

1. 1P(original shares – shares bought back)

$$= 1.1p(5\text{ lakhs} - 27\% \text{ of } 50 \text{ lakhs}/P)$$

$$= 5.5 \text{ lakhs} \times P - 13.5 \text{ lakhs} \times 1.1 = 5.5 \text{ lakhs } P - 14.85 \text{ lakhs}$$

Again, 5.5 lakhs P – 105 lakhs + 14.85 lakhs

Or P = 119.85/5.5 = Rs 21.79 per share

ii) Number of shares to be bought back:

$$\text{Rs } 13.5 \text{ lakhs} = 61,952.02 \text{ (approx.) or } 61,952 \text{ share}$$

Rs 21.79

iii) New equity shares:

$$5,00,000 - 61,952 = 4,38,048$$

Therefore, EPS = 1.5x5lakhs/4,38,048 = Rs 1.712

Thus, EPS of Rahul Ltd., increases to Rs 1.712

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**THE END**