CHAPTER 4

Solved Problems

P.4.12 An investor is considering the purchase of a share of ABC Ltd at the beginning of the year. If his required rate of return is 10 per cent, the year-end expected dividend is Rs 4 and year-end price is expected to be Rs 26, compute the value of the share.

Solution The expected price (P_0) = [D_1/(1 + r)] + [P_1/(1 + r)] = [Rs 4/(1.10)] + [Rs 26/(1.10)] = (Rs 4 × 0.9091) + (Rs 26 × 0.9091) = Rs 3.64 + Rs 23.64) = Rs 27.28.

P.4.13 An investor has invested in the shares of ABC Ltd which expects no (zero) growth in dividends. ABC Ltd has paid a dividend of Rs 3 per share. If the required rate of return is 14 per cent, what would be the value of the share?

Solution $P_0 = D/r$ = Rs 3/0.14 = Rs 21.43.

P.4.14 The closing price of the shares of ABC Ltd on December 31, previous year, was Rs 25. It paid a year-end dividend as detailed below:
At what price should an investor sell his shares at the end of year 5 to earn a compound rate of return of 15 per cent on the initial investment (of Rs 25). Ignore commission and taxes.

Solution

P_0

Rs 25

(a) Present value of dividends, years 1 – 5 = Rs 2(0.8696) + Rs 2(0.7561) + Rs 2.20(0.6575) + Rs 2.50(0.5718) + Rs 2.50(0.4972) = Rs 1.74 + Rs 1.51 + Rs 1.45 + Rs 1.43 + Rs 1.24 = Rs 7.73

(b) Therefore, Rs 25 = Rs 7.37 + $P_5/(1.15)^5$

Rs 25 = Rs 7.37 + P_5(0.4972)

P_5(0.4972) = Rs 25 – Rs 7.37

P_5 = Rs 17.63/0.4972 = Rs 35.46

P.4.15 The shares of ABC Ltd are currently selling for Rs 100 on which the expected dividend is Rs 4. Compute the total return on the shares if the earnings or dividends are likely to grow at (a) 5 per cent (b) 10 per cent and (c) 0 (zero) per cent (no growth).

Solution $r = (D_1/P_0) + g$

(a) Rate of growth, 5 per cent:
r = (Rs 4/Rs 100) + 0.05 = 0.04 + 0.05 = 9 per cent

(b) Rate of growth, 10 per cent:
r = (Rs 4/Rs 100) + 0.10 = 14 per cent

(c) Rate of growth, 0 (zero) per cent (no growth):
r = Rs 4/Rs 100 = 4 per cent

P.4.16 ABC Ltd paid a dividend of Rs 2 per share last year (D_0), which is expected to grow at 10 per cent. If the current market price is Rs 40 and the required rate of return is 18 per cent, compute the expected dividend yield and capital gains yield next year.

Solution Dividend yield = [Rs 2(1 + 0.10)]/Rs 40 = Rs 2.20/Rs 40 = 0.055 = 5.5 per cent.
Capital gain yield = rate of return – dividend yield = 0.18 – 0.055 = 12.5 per cent.

Review Questions

4.12 The PIL is considering a proposal to invest in either of two outstanding bonds, both having Rs 100 par value and 10 per cent coupon interest rate. Both bonds pay interest annually. The maturity of bond A is 5 years while bond B has 15 years to maturity.

Required

1. Calculate the value of bond A and bond B assuming (i) 7 per cent, (ii) 10 per cent, and (iii) 13 per cent required rate of return.
2. Complete the following table from the information computed above in (1).

Required return (%)	*Value of bond A*	*Value of bond B*

7	?	?
10	?	?
13	?	?

On the basis of tabulated information, discuss the relationship between time to maturity and changing required returns.

3. If the PIL wants to minimise interest rate risk, which bond should it purchase?

4.13 The bonds of PIL currently sell for Rs 95. The par value of the bonds is Rs 100. With a 10 per cent coupon rate of interest, the interest is paid annually. The bonds have 10 years to maturity. Compute the yield to maturity (YTM) on the bond. Also, explain the relationship between (i) coupon rate and the YTM and (ii) market value and par value of the bond.

4.14 The following relate to a bond:

- Par value, Rs 100
- Coupon interest rate, 12 per cent
- Required rate of return on similar risk bond, 16 per cent
- Years to maturity, 10 years

Compute the value of the bond if the interest is paid (i) semiannually, (ii) quarterly and (iii) monthly.

4.15 The dividends par share (DPS) paid by the PIL over the last 6 years are given below:

Year	*DPS*	*Year*	*DPS*
1	Rs 4.50	4	Rs 5.20
2	4.74	5	5.52
3	4.92	6	5.74

The expected dividend next year is Rs 6.04. How much would you pay per share if you can earn on similar risk investment (a) 14 per cent, (b) 11 per cent? Discuss the impact of changing risk on share value.

4.16 From the undermentioned facts, find the market value of shares.

- Most recent dividend paid per share, Rs 3
- Required return, 10 per cent
- Growth in dividends: 7 per cent annually for 3 years followed by (i) 14 per cent constant (ii) zero per cent, and (iii) 9 per cent annual growth rate in years 4 to infinity.

4.17 The par value of a preference share is Rs 100. The annual preference dividend is Rs 11 per share. Similar risk preference shares are currently earning 13 per cent annual return. Find the market value of the outstanding preference shares. If the required return rises to 15 per cent, how much would be the gain/loss per share to the investor who bought it at the current market value?

4.18 Find the value of the share from the data tabulated below:

Firm	*Expected EPS*	*P/E multiple*
A	Rs 5.00	8.3
B	7.50	12.5
C	3.00	15.2
D	4.00	11.5
E	8.50	22.0

4.19 The most recent dividend paid by the PIL was Rs 6 per share. Its expected annual rate of growth in dividends is 6 per cent. The required rate of return is 15 per cent. Determine the share price if as a result of management action (i) annual dividend growth (g) would increase to 7 per cent and required return (r) would decline to 13 per cent, (iii) g would increase to 8 per cent and r would increase to 18 per cent, (iv) g would decline to 5 per cent and r would increase to 16 per cent and (v) g would increase to 9 per cent and r would increase to 18 per cent. Which is the best alternative?

4.20 The following information relates to the PIL.

- Beta, B, 1.50
- Risk-free return, 12 per cent
- Market return, 16 per cent
- Proposed dividend, next year (D_1), Rs 5.20 per share
- Annual rate of growth in dividends consistent with the experience over years 1-7 when the actual dividends paid were as follows:

Year	*DPS*	*Year*	*DPS*
1	Rs 3.46	4	Rs 3.80

2	3.60	5	4.20
3	3.64	6	4.56
		7	4.90

Using the CAPM, determine the required return. Also, find the value of the shares of PIL, using constant growth model. What effect would a reduction in beta have on the value of shares?

4.21 From the undermentioned facts relating to PIL, compute the maximum price an investor should pay for its shares.

- Beta, B, 1.40
- Risk-free rate, 10 per cent
- Market return, 15 per cent
- Historical dividend per share

Year	*DPS*	*Year*	*DPS*
1	Rs 2.90	4	Rs 6.30
2	3.50	5	6.56
3	4.80	6	6.88

- Proposed dividend, next year (D_1), Rs 7.36

Show the impact of (1) decrease in beta from 1.40 to 1 and (2) 2 per cent decrease in g on the value of the shares of PIL.

4.22 Using the information tabulated below, compute the value of each asset.

Asset	*Cash flow*		*Required return (%)*
	Year-end	*Amount*	
A	1	Rs 10,000	
	2	10,000	15
	3	10,000	
B	1 through ∞	600	12
C	1	0	
	2	0	
	3	0	13
	4	0	
	5	70,000	
D	1-5	3,000	
	6	17,000	9
E	1	4,000	
	2	6,000	
	3	10,000	11
	4	14,000	
	5	8,000	
	6	2,000	

4.23 Calculate the value of each bond detailed below assuming annual interest payments.

Bond	*Par value*	*Coupon interest rate (%)*	*Year to maturity*	*Required return (%)*
A	Rs 20,000	16	18	13
B	20,000	10	14	9
C	2,000	12	6	14
D	1,000	18	11	19
E	20,000	14	8	11

4.24 The following relate to a 15-year bond issued by the PIL:

- Coupon interest rate, 14 per cent
- Par value, Rs 100
- Interest payment, annually
- Current required return, 16 per cent and would remain at 16 per cent till the maturity of the bond in 14 years.

Find the value of the bond with (i) 15 years, (ii) 11 years, (iii) 8 years, (iv) 5 years, (v) 2 years and (vi) 1 year to maturity.