

Lecture 2

Illustration 1. Consider a 8-year, 12 per cent coupon bond with a par value of Rs. 100 on which interest is payable semi-annually. The required return on this bond is 14 per cent.

Solution.

Applying Eq. the value of the bond is:

P =

$$\begin{aligned} &= 6 (\text{PVIFA}_{7\%, 16 \text{ yr}}) + 100 (\text{PVIF}_{7\%, 16 \text{ yr}}) \\ &= \text{Rs. } 6 (9.447) + \text{Rs. } 100 (0.388) = \text{Rs. } 95.5. \end{aligned}$$

Illustration 2. Of the following which amount is worth more at 16 per cent; Rs. 1000 today or Rs. 2100 after five years.

Solution.

The present worth of Rs. 2100

$$\begin{aligned} &= \\ &= \frac{2100}{(1 + 0.16)^5} \\ &= 2100 \times 0.476 = 999.60 \end{aligned}$$

The present worth of Rs. 2100 is Rs. 999.60 which is less than Rs. 1,000. Hence Rs. 2100 after five years is not worthwhile.

Illustration 3. Determine the price of Rs. 1,000 zero coupon bond with yield to maturity of 18 per cent and 10 years to maturity. What is YTM of this bond if its price is Rs. 220 ?

Solution.

$$\begin{aligned}
 \text{(a)} \quad \text{Price} &= \frac{\text{Face value}}{(1 + \text{YTM})^n} \\
 &= \frac{1,000}{(1 + 0.18)^{10}} = \frac{1,000}{5.2338} \\
 &= \text{Rs. } 191.07
 \end{aligned}$$

$$\text{(b)} \quad \left(\frac{\text{Face value}}{\text{Bond value}} \right)^{1/T} - 1 = \text{YTM}$$

$$\left(\frac{\text{Rs. } 1000}{\text{Rs. } 200} \right)^{1/w} - 1 = \text{YTM}$$

$$(4.55)^{0.1} - 1 = \text{YTM}$$

$$1.163 - 1 = 0.163$$

$$\text{YTM} = 16.3$$

Illustration 4. Arvind considers Rs. 1000 par value bond bearing a coupon rate of 11% that matures after 5 years. He wants a minimum yield to maturity of 15%. The bond is currently sold at Rs. 870. Should he buy the bond ?

Solution.

$$P_0 = \frac{\text{Coupon}}{(1 + Y)} + \dots + \frac{\text{Coupon} + \text{Face value}}{(1 + Y)^5}$$

(or)

$$P_0 = (\text{Coupon}) (\text{PVIFA}, n) + (\text{Principal amount}) (\text{PVIF}/k, n)$$

$$\begin{aligned}
P_0 &= 110 (\text{PVIFA } 15\%, 5 \text{ years}) + 1000 (\text{PVIF}/15\%, 5 \text{ yrs}) \\
&= 110 (3.352) + 1000 (0.497) \\
&= 368.7 + 497 = 865.7.
\end{aligned}$$

At Arvind's anticipated minimum yield of 15% the price should be Rs. 865.70 but the market price is higher. Hence, he should not buy.

Illustration 5. A owns Rs. 1,000 face value bond with five years to maturity. The bond has an annual coupon of Rs. 75. The bond is currently priced at Rs. 970. Given an appropriate discount rate of 10%, should A hold or sell the bond?

Solution.

$$\begin{aligned}
P_0 &= \text{Coupon (PVIFA } k, n) + \text{Principal amount (PVIF } k, n) \\
&= 75 (\text{PVIFA } 10\%, 5 \text{ yrs}) + 1000 (\text{PVIF } 10\%, 5 \text{ yrs}) \\
&= 75 \times 3.7908 + 1000 (0.6209) \\
&= \text{Rs. } 284.31 + 620.9 \\
&= \text{Rs. } 905.21.
\end{aligned}$$

The market price Rs. 970 is higher than the estimated price Rs. 905.2. It is better for Anand to sell the bond.
