FINM2063 Introduction to Finance

Chapter 8 Exercises

Solutions

1. a. Price of the bond:

PB = $75.00 +....+ $75.00 + $1,000

(1 + .10) (1 + .10)10 (1 + .10)10

= $75(6.145) + $1,000(0.386)

= $847

(PV = ?; PMT = 75.00; FV = 1000; N = 10, and I = 10.

PV = -846.)

b. Price of the bond:

PB = $75.00 +....+ $75.00 + $1,000

(1 + .10) (1 + .10)4 (1 + .10)4

= $75(3.170) + $1,000(0.683)

= $921

(PV = ?; PMT = 75.00; FV = 1000; N = 4, and I = 10.

PV = -921.)

c. The term to maturity has diminished which increases the value of the bond (i.e., the investor gets the principal back in only four instead of ten years).

d. Price of the bond (ten years to maturity):

PB = $75.00 +....+ $75.00 + $1,000

(1 + .06) (1 + .06)10 (1 + .06)10

= $75(7.360) + $1,000(0.558) = $$1,110

(PV = ?; PMT = 75; FV = 1000; N = 10, and I = 6.

PV = -1110.)

Price of the bond (four years to maturity):

PB = $75.00 +....+ $75.00 + $1,000

(1 + .06) (1 + .06)4 (1 + .06)4

= $75(5.242) + $1,000(0.792) = $1,052

(PV = ?; PMT = 75; FV = 1000; N = 4, and I = 6.

PV = -1052.)

The term to maturity is less, but in this illustration the value of the bond declines. In the previous example, the bond sold for a discount. Now it sells for a premium, which declines as the bond approaches maturity. The investor earns the higher coupon interest for a shorter time period, which decreases the attractiveness of the bond.

1. Notice that five years have passed since the bond was issued, so the bond has ten years to maturity. The yield to maturity in part b is based on the remaining ten years and not the initial fifteen years.

a. The current yield = $50/$690 = 7.25%

b. Determination of the yield to maturity (r):

$690 = $50 +....+ $50 + $1,000

(1 + r) (1 + r)10 (1 + r)10

Select an interest rate (e.g., 10%) and substitute into the equation: $50(6.145) + $1,000(.386) = $692.

The yield to maturity is approximately 10 percent.

(PV = -690; PMT = 50; FV = 1000; N = 10, and I = ?.

I = 10.06%.)

This answer assumes annual payments. If semiannual payments are used, the yield to maturity is

PV = -690; PMT = 25; FV = 1000; N = 20, and I = ?.

I = 4.98%, which is 9.96% an annual basis.

c. Since the bond is selling for a discount, that discount will diminish over time even if interest rates remain stable. If yields are 10 percent five years later, the price of the bond is

PB = $50 +....+ $50 + $1,000

(1 + .1) (1 + .1)5 (1 + .1)5

= $50(3.790) + $1,000(.621) = $810

(PV = ?; PMT = 50; FV = 1000; N = 5, and I = 10.

PV = -810.)

Interest rates have not changed but the bond matures in five years; its value rises from $692 to $810.

1. a. The bonds now have n = 8 x 2 = 16 interest payments remaining until maturity, and their value is calculated as follows:



Calculator solution: Input N = 16, I/Y= 3, PMT = 50, and FV = 1,000, compute PV = -1,251.22.

b. The price of the bond will decline from $1,251.22 toward $1,000, hitting $1,000 (plus accrued interest) at the maturity date eight years (16 six‑month periods) from now (assuming the firm does not default).