

$a_n \bar{\cdot} = (1-v^n)/(i/2) = v + v^2 + v^3 + \dots + v^n$
 = present value of 1 per period for n periods

A = accrued interest

A. For fixed-principal securities with a regular first interest payment period:
 Formula:

$$P[1 + (r/s)(i/2)] = (C/2)(r/s) + (C/2) a_n \bar{\cdot} + 100 v^n$$

Example:

For an 8¾% 30-year bond issued May 15, 1990, due May 15, 2020, with interest payments on November 15 and May 15, solve for the price per 100 (P) at a yield of 8.84%.

Definitions:

C = 8.75

i = .0884

r = 184 (May 15 to November 15, 1990)

s = 184 (May 15 to November 15, 1990)

n = 59 (There are 60 full semiannual periods, but n is reduced by 1 because the issue date is a coupon frequency date.)
 $v^n = 1/[(1 + .0884/2)]^{59}$, or .077940
 $a_n \bar{\cdot} = (1-.077940)/.0442$, or 20.861086
 Resolution:

$$P[1 + (r/s)(i/2)] = (C/2)(r/s) + (C/2) a_n \bar{\cdot} + 100 v^n \text{ or}$$

$$P[1 + (184/184)(.0884/2)] = (8.75/2)(184/184) + (8.75/2)(20.861086) + 100(.077940)$$

$$(1) P[1 + .0442] = 4.375 + 91.267251 + 7.7940$$

$$(2) P[1.0442] = 103.436251$$

$$(3) P = 103.436251 / 1.0442$$

$$(4) P = 99.057892$$

$$(5) P = 99.058$$

B. For fixed-principal securities with a short first interest payment period:

Formula:

$$P[1 + (r/s)(i/2)] = (C/2)(r/s) + (C/2) a_n \bar{\cdot} + 100 v^n$$

Example:

For an 8½% 2-year note issued April 2, 1990, due March 31, 1992, with interest payments on September 30 and March 31,

solve for the price per 100 (P) at a yield of 8.59%.

Definitions:

C = 8.50

i = .0859

n = 3

r = 181 (April 2 to September 30, 1990)

s = 183 (March 31 to September 30, 1990)

$v^n = 1/[(1 + .0859/2)]^3$, or .881474

$a_n \bar{\cdot} = (1-.881474)/.04295$, or 2.759627