Section 6.6: Determination of Yield Returns

One method to approximate the calculation of the yield rate is to use the bond salesman's method. This can be found in your textbook on page 220, **if** you are interested. The other method is to use the financial calculator to get the exact yield.

Example: A 20 year bond with 8% semiannual coupons and a face amount of 100 is quoted at a purchase price of 70.400.

A) Find the yield rate.

$F = 100 = C$ $\quad F_r = 100(.04) = 4$

$r = 4\%$

$n = 20(2) = 40$

price $= 70.400$

$$70.400 = 4\, a_{\overline{40}|i} + 100\, v^{40}$$

TVM solver

$N = 40$

$I\% = cpt$ → 5.956482355

$PV = -70.40$

$PMT = 4$

$FV = 100$

$I/Y = C/Y = 1$

$\frac{i^{(2)}}{2}$

BA calc

Bond worksheet $\quad 2^{nd}$ q

SDT = 1.0100

CPN = 8

RDT = 1.0120

RV = 100

ACT

2/y

yield calculate → 11.91296477%

price = 70.4

$i^{(2)}$

Answer = 11.91296 % compounded semiannually.

B) Suppose that the bond was issued Jan 15, 2000, and is bought by a new purchaser for a price of 112.225 on Jan. 15, 2005, just after a coupon has been paid.

(i) Find the yield rate for the new purchaser.

Jan 15 this is a coupon date so can use the TVM solver

from the new person's view

# of coupons = 15(2) = 30

need the Book value with 30 Remaining coupons.

Fr = 4 F = 100 = C

TVM

N = 30
I = solve
PV = -112.225
PMT = 4
FV = 100

3.34668356 %

$i^{(2)}$ = 6.69336712 %

BA calc
Bond worksheet 2nd 4

SDT = 1.1505
CPN = 8
RDT = 1.1520
RV = 100
ACT
2/y
yield calculate →
price = 112.225

B) Suppose that the bond was issued Jan 15, 2000, and is bought by a new purchaser for a price of 112.225 on Jan. 15, 2005, just after a coupon has been paid.

(ii) Find the yield rate earned by the original bond holder.

Bought Bond on 1/15/2000

Sold 1/15/2005

TVM

N = 10

I = solve

PV = -70.40

PMT = 4

FV = 112.225

BA calc

Bond worksheet 2nd Q

SDT = 1.1500

CPN = 8

RDT = 1.1505

RV = 112.225

ACT

2/y

yield calculate →

price = 70.4

$\frac{i^{(2)}}{2} = 9.499918\%$

$i^{(2)} = 18.999836$ nominal semiannual Rate.

(c) Repeat part (i) of part (b) if the bond is sold on April 1, 2005 with a market price of 112.225

↳ find yield rate for the new purchaser

① 4/1 is not a coupon date

Coupons on
1/15
7/15

② For pricing
Theoretical
practical
semi theoretical → BA Bond work sheet can be used.

Market price is the price given by calc

BA calc
Bond worksheet 2nd q

SDT = 4.0105
CPN = 8
RDT = 1.1520
RV = 100
ACT
2/y
yield calculate →
price = 112.225

$i^{(2)} = 6.68120468\%$

Semitheoretical method. need book value on Jan 15, 2005

$B_{10} = 4a_{\overline{30}|i} + 100v^{30}$ $\quad i$ = semiannual eff Rate.

$B^f = \left\{4a_{\overline{30}|i} + 100v^{30}\right\}(1+i)^K$

$K = \frac{dbd(1.1505, 4.0105, ACT)}{dbd(1.1505, 7.1505, ACT)} = \frac{76}{181}$

$Fr_K = KFr = 4K$

$B^m = B^f + Fr_K$

$112.225 = \left\{4a_{\overline{30}|i} + 100v^{30}\right\}(1+i)^K + 4K$

Solve for i