

Homework Set 3 - solutions

1. $F=C=1000$ $r=g=.06$ $i=.05$ $n?$ $P?$

$$Cg = 1000(.06) = 60 \text{ coupon pmts.}$$

$$P_5 = 60 - 53.23 = 6.77 = C(g-i)v^{n+1-5} = 1000(.01)v^{n-4}$$

$$\text{So } v^{n-4} = .677 = \left(\frac{1}{1.05}\right)^{n-4} \quad n=12$$

$$P = C + C(g-i)a_{\overline{n}|i} = 1000 + 1000(.01)a_{\overline{12}|.05} \\ = 1088.63$$

2.

$$P = C + C(g-i)a_{\overline{n}|i} \\ = C + (Cg - Ci)a_{\overline{n}|i} \\ = C + (Fr - Ci)a_{\overline{n}|i}$$

1st Bond:

$$110 = 100 + 100(.03 - .02)a_{\overline{n}|.07}$$

$$110 = 100 + a_{\overline{n}|.07}$$

$$a_{\overline{n}|.07} = 10$$

2nd Bond:

$$P = 100 + 100(.015 - .02)a_{\overline{n}|.07}$$

$$= 100 - (.5)a_{\overline{n}|.07}$$

$$= 100 - (.5)(10)$$

$$= 95$$

$$3. \quad (a) \quad B = 12400 \quad A = 10000 \quad C = 1000 + 300 - 700 = 600$$

$$I = B - A - C = 1800$$

$$\begin{aligned} \sum C_t(1-t) &= 1000\left(\frac{11}{12}\right) + 300\left(\frac{4}{12}\right) - 700\left(\frac{7}{12}\right) \\ &= 608.33\bar{3} \end{aligned}$$

$$i = \frac{I}{A + \sum C_t(1-t)} = \frac{1800}{10000 + 608.33\bar{3}} = \underline{\underline{.1696779}}$$

$$(b) \quad (1+j_1) = \frac{10250}{10000} = (1.025)$$

$$(1+j_2) = \frac{11230}{10250+1000} = (.99822\bar{2})$$

$$(1+j_3) = \frac{11040}{11230-700} = (1.0484330)$$

$$(1+j_4) = \frac{12400}{11040+300} = (1.0934744)$$

$$(1+i) = (1+j_1)(1+j_2)(1+j_3)(1+j_4)$$

$$= 1.17300648$$

$$i = \underline{\underline{.17300648}}$$