Supplementary Problems I

Answers

Problems from Chapter 4:

12. You would rather be holding long-term bonds because their price would increase more than the price of the short-term bonds, giving them a higher return.

14. People are more likely to buy houses because the real interest rate when purchasing a house has fallen from 3 percent (= 5 percent - 2 percent) to 1 percent (= 10 percent - 9 percent). The real cost of financing the house is thus lower, even though mortgage rates have risen. (If the tax deductibility of interest payments is allowed for, then it becomes even more likely that people will buy houses.)

Additional problems: see next page.
1. \textit{Part a.}

At a coupon rate of 10\% and yield to maturity 2 years, the cash flow will be $100 (10\% of face value) coupon payment after first year, plus $100 coupon payment and $1000 face value payment after two years. Given that its yield to maturity is 3.86\%, the price will be

\[ P_{2002} = PV \text{ (at } YTM) = \frac{100}{1.0386} + \frac{100}{1.0386^2} + \frac{1000}{1.0386^2} = 1116 \]

\textit{Part b.} At 16\% interest rate the price will fall (why? because the market competition will ensure that every similar investment yields the same interest rate i.e., yield to maturity). Since the remaining cash flow is only $100 coupon payment and $1000 face value payment, both after one year, the new price will be

\[ P_{2003} = PV \text{ (at } 16\%) = \frac{100}{1.16} + \frac{1000}{1.16} = 948.28 \]

Hence, the rate of return will be

\[ RET = \frac{C + P_{t+1} - P_t}{P_t} = \frac{100 + 948.28 - 1116}{1116} = -0.06068 \]

\[ = -6.07\%. \]

\textit{Part c.} If you could hold it until its maturity of full two years, then, as in part a, its return will be equal to its yield to maturity = 3.86\%. But, if you held it for full two years, you would forego 16\% interest rate during the second year. As economists, we should always compare the costs and the benefits with alternatives. Hence, you still loose money.

2. First, we should find its nominal return, which is equal to the yield to maturity. YTM can be obtained from

\[ 800 = \frac{1000}{(1 + i)^2} \]

which implies that

\[ i = \left( \frac{1000}{800} \right)^{\frac{1}{2}} - 1 = 0.118 \]

Hence, nominal return = 11.8\%. If the annual rate of inflation is 4\%, the expected real return is

\[ i_r = i - \pi^e = 11.8 - 4 = 7.8\% \]

If the actual inflation rate turns out to be 6\%, then the real rate of return is

\[ i - \pi^a = 11.8\% - 6 = 5.8\% \]

The issuer expected to pay 7.8\% in real terms, but ended up paying only 5.8\%. Hence, the issuer is better off.