Assignment 2 - Submission

A0219739N - Le Van Minh

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1.

Maturity	YTM
1	4.7%
2	4.8%
3	5.0%

2. (a)

$$1135.9 = \frac{50}{r} \times \left(1 - \frac{1}{(1+r)^{20}}\right) + \frac{1000}{(1+r)^{20}}$$

$$r = 4\%$$
$$YTM = r \times 2 = 8\%$$

(b)

$$r = APR \div 2 = 5\%$$
$$P = \frac{50}{r} \times \left(1 - \frac{1}{(1+r)^{20}}\right) + \frac{1000}{(1+r)^{20}}$$
$$= 1000$$

3. Supposed the bond face value is \$1000, the bond price is:

$$P = \frac{50}{1+YTM_1} + \frac{50}{(1+YTM_2)^2} + \frac{1050}{(1+YTM_3)^3}$$
$$= 1000.3$$
$$= \frac{50}{r} \times \left(1 - \frac{1}{(1+r)^3}\right) + \frac{1000}{(1+r)^3}$$

$$r = YTM = 5\%$$

4. let r_i be i-year risk free interest rate. With the one-year bond $r = YTM \div 2 = 3\%$:

$$P = \sum_{i=1}^{2} \frac{4\% \times FV}{(1+3\%)^i} + \frac{FV}{(1+3\%)^2} = \frac{4\% \times FV}{1+2\%} + \frac{(4\%+1) \times FV}{1+r_1}$$
$$r_1 = 6.1\%$$

With the two-year bond $r = 5\%$:

$$P = \sum_{i=1}^{2} \frac{10\% \times FV}{(1+5\%)^i} + \frac{FV}{(1+5\%)^2} = \frac{10\% \times FV}{1+6.1\%} + \frac{(10\%+1) \times FV}{1+r_2}$$

$$r_1 = 10.1\%$$

5. Suppose the bond promise to pay \$100 upon maturity, the expected return is $E(income) = 0.6 \times 100 + 0.4 \times 20 = 68$. With 10% risk premium $r = 2\% + 10\% = 12\%$:

$$P = \frac{68}{1+12\%} = 60.71$$

$$YTM = \frac{FV}{P} - 1 = 64.7\%$$