MATH 373
Quiz 4
Fall 2019

November 12, 2019

1. The preferred stock of Wiser Corporation pays quarterly dividends of 1.25 with the next dividend to be paid in 1 month.

   Using an interest rate of 12% compounded quarterly and the dividend discount method, determine the price of the preferred stock.

   Solution:

   We need $\frac{i^{(4)}}{4}$. We are given $i^{(4)} = 0.12$, so $\frac{i^{(4)}}{4} = \frac{0.12}{4} = 0.03$.

   $$Price = PV = \left(\frac{1.25}{0.03}\right)(1.03)^{2/3} = 42.496$$

   We multiply by $(1.03)^{2/3}$ because the first dividend is paid at the end of 1 month.

2. The common stock of Beckley Corporation pays quarterly dividends. The next dividend of 2 will be paid in 3 months. Future dividends are expected to increase with a dividend of 2(1.01) being paid in 6 months. The dividend to be paid in 9 months will be $2(1.01)^2$. Dividends will continue to increase in the same pattern.

   Using the dividend discount method with an annual effective interest rate of 12%, determine the price of the common stock of Beckley Corporation.

   Solution:

   We need $\frac{i^{(4)}}{4}$. We are given $i = 0.12$, so $\frac{i^{(4)}}{4} = (1.12)^{\frac{1}{4}} - 1 = 0.028737345$.

   $$Price = PV = 2(1.028737345)^{-1} + 2(1.01)(1.028737345)^{-2} + 2(1.01)^2(1.028737345)^{-3} + \cdots$$

   $$= \frac{2(1.028737345)^{-1} - 0}{1 - (1.01)(1.028737345)^{-1}} = 106.74$$

3. The common stock of Mills Company pays a quarterly dividend. The next dividend of 3 is payable in 3 months. Subsequent dividends are expected to each be 0.15 greater than the prior dividend. In other words, the second dividend will be 3.15, the third dividend will be 3.30, etc.

   Using the dividend discount method with an annual effective interest rate of i, the stock price is 360.

   Determine i.

   Solution:

$$Price = PV = 360 = \frac{3.00}{\frac{i^{(4)}}{4}} + \frac{0.15}{\left(\frac{i^{(4)}}{4}\right)^2} \quad ==> \quad 360\left(\frac{i^{(4)}}{4}\right)^2 - 3.00\frac{i^{(4)}}{4} - 0.15 = 0$$

   Solve for $\frac{i^{(4)}}{4}$:

$$\frac{i^{(4)}}{4} = \frac{3.00 + \sqrt{(-3.00)^2 - 4(-0.15)(360)}}{2(360)} = 0.025$$

   Solve for i:

$$i = \left(1 + \frac{i^{(4)}}{4}\right)^4 - 1 = (1.025)^4 - 1 = 0.103812891$$