MATH 373
Quiz 4
Spring 2019

April 4, 2019

1. Teddy owns a bond that pays annual coupons of 500. The book value of the bond right after the 10th coupon is 14,844.42. The book value on the bond right after the 11th coupon is 14,820.92.

   Calculate the yield rate on this bond.

   Solution:

   The easy way:

   $$B_{k-1}(1+j) - Fr = B_k \Longrightarrow 14,844.42(1+j) - 500 = 14,820.92$$

   $$14,844.42(1+j) = 15,320.92 \Longrightarrow j = \frac{15,320.92}{14,844.42} - 1 = 0.0321$$

   Or:

   $$Fr = 500 = \mathrm{Pr}_{11} + Int_{11}$$

   $$B_{10} - \mathrm{Pr}_{11} = B_{11} \Longrightarrow \mathrm{Pr}_{11} = 14,844.42 - 14,820.92 = 23.50$$

   $$Int_{11} = 500 - 23.50 = 476.50$$

   $$B_{10} \cdot j = Int_{11} \Longrightarrow (14,844.42)(j) = 476.50 \Longrightarrow j = \frac{476.50}{14,844.42} = 0.0321$$

2. The Vinyard Corporation issues a 10 year callable bond. The bond matures for its par value of 10,000. The bond has coupons payable semi-annually at a rate of 7.5% compounded semi-annually.

   The bond is callable at the end of 6 years with a call value of 10,250.

   The bond is callable at the end of 8 years with a call value of 10,125.

   The bond is purchased to yield 6.8% compounded semi-annually.

   Determine the price of the The Vinyard's bond.

   Solution:

n	I/Y	PMT	FV	CPT PV
(6)(2)=12	**6.8/2=3.4**	**(10,000)(0.075/2)=375**	**10,250**	**10,507.59**
(8)(2)=16	**3.4**	**375**	**10,125**	**10,499.70**
(10)(2)=20	**3.4**	**375**	**10,000**	**10,501.97**

   Answer is lowest price of 10,499.70

3. Mary buys a 20 year bond with semi-annual coupons at a rate of 6% compounded semi-annually. The bond has a par value of F and matures for $F+100$. The price of the bond is 1029.78 using a yield rate of 5.8% compounded semi-annually.

   Determine the amount of the premium or the discount in the sale of this bond. Be sure to state whether it is a premium or discount.

   Solution:

   $$P = Fra_{\overline{40}|} + Cv^{40}$$

   $$1029.78 = F(0.03)\left(\frac{1-(1.029)^{-40}}{0.029}\right) + (F+100)(1.029)^{-40}$$

   $$1029.78 = (0.704790867)F + (0.318702162)F + 31.87$$

   $$F = \frac{1029.78 - 31.87}{1.023493029} = 975.00$$

   $$C = 975.00 + 100.00 = 1075.00$$

   $$\text{Since } C > P \Longrightarrow Discount = 1075.00 - 1029.78 = 45.22$$