PROBLEM SET: Bond Pricing

Exercise 1. [2]

A pure discount bond has a face value of 10,000 and matures in six years. The yield-to-maturity of similar bonds is currently 9 percent. Compounding is discrete, annual.

What is the current price of the bond?

1. 1,592.05
2. 4,600.00
3. 5,962.67
4. 7,721.83
5. I choose not to answer.

Exercise 2. [2]

A corporate bond with a face value of kr 1000 has 6 years to maturity and an annual coupon rate of 8% with annual payments. The bond's price today is kr 958. Compounding is discrete, annual.

What is the bond's yield to maturity?

1. 7.46%
2. 7.81%
3. 8.89%
4. 8.93%
5. I choose not to answer.

Exercise 3. *Bond* [2]

A 10-year bond is issued with a face value of €1,000, paying interest of €60 a year. If market yields fall shortly after the bond is issued, what happens to the bond's

1. Coupon Rate?
2. Price?
3. Yield to Maturity?

Exercise 4. [2]

What is the yield to maturity on a 5-year bond with a nominal value of $100, a 10% coupon rate, an annual coupon frequency and a price of 97.856?

Exercise 5. *Dr No's Bond* [4]

Dr No owns a bond, serial number 007, issued by the James Company. The bond pays $100 for each of the next three years, at which time it is retired and pays its face value of $1000.

(a) How much is the James' bond 007 worth to Dr No at an interest rate of 10%?

(b) How valuable is James bond 007 at an interest rate of 5%?

Ms Yes offers Dr No $1,100 for the James bond 007.

(c) Should Dr No say yes or no to Ms Yes if the interest rate is 10%?

(d) What if the interest rate is 5%?

In order to destroy the world, Dr No hires Professor Know to develop a nasty zap beam. In order to lure Professor Know from his cushy-soft university position at Jail university, Dr No will have to pay the professor \$100 a year. The nasty zap beam will take three years to develop, at the end of which it can be built for \$1000.

(e) If the interest rate is 5%, how much money will Dr No need to finance this dastardly program?

(f) If the interest rate was 10%, would the world be in more danger or less danger from Dr No?

Exercise 6. [2]
A bond is currently priced at $B_0 = 97.5563$. The bond has an annual coupon of 10% (with discrete, annual compounding), a face value of 100, and a time to maturity of 3 years.

1. If the current (annual, discretely compounded) interest rate decreases by one percentage point, what is the new bond price?

Exercise 7. [3]
Suppose you have the following three bonds:

Bond	Coupon	Principal	Maturity
A	50	1000	10 years
B	100	1000	10 years
C	0	1000	10 years

The current term structure of interest rates is as follows:

Year	Spot rate r_t
1	5%
2	6%
3	7%
4	8%
5	9%
6	10%
7	11%
8	12%
9	13%
10	14%

Interest rates are compounded annually.

1. Determine the prices and yield to maturity of these bonds.

Exercise 8. *Bond* [4]
The appropriate discount rate for cash flows received one year from now is 7.5%. The appropriate discount rate for cash flows received two years from now is 11%. The appropriate discount rate for cash flows received three years from now is 14%. Interest rates are compounded annually.

1. What is the price of a two–year bond with a 6% (annual) coupon and a face value of 1000?
2. What is the yield–to–maturity of this bond?