

MATH 2600/STAT 2600, Theory of Interest

FALL 2010

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Homework Sheet 6

**Due: Thursday 25th November.**

1. Calculate the price that should be paid for each of the following bonds to obtain the desired yield:
  - (a) face value \$5,000, maturing at par in 15 years, coupon rate 8%, desired yield  $j_2 = 7\%$ .
  - (b) face value \$2,000, maturing at 110 in 5 years, coupon rate 6%, desired yield  $j_2 = 6.5\%$ .
2. Calculate the yield from the following bond, using linear interpolation to get a more accurate answer. Face value \$1,000, maturing at par in 5 years, coupon rate 4%, bought for \$922
3. Write out a complete bond amortisation schedule for a bond with face value \$2,000 with coupon rate 5%, maturing at 105 in 4 years, sold to an investor who wishes to receive a yield of 6%.
4. An investor wants to buy a callable bond with face value \$10,000, maturing at par in 10 years, with coupon rate 6%, callable at 105 after 5 years.
  - (a) If she wishes to guarantee a return of 7%, how much should she pay?
  - (b) If she sells it after 3 years to an investor who wishes to guarantee a return of 4%, how much does she receive?
  - (c) If the bond were not callable after 5 years, for how much would she be able to sell it to the buyer in (b)?
5. A bond with face value \$500, maturity date 1st January 2033 and coupon rate 5% is sold on 4th March 2011 to an investor who wishes a yield of 4.5%. Calculate
  - (a) The flat price [use compound interest].
  - (b) The quoted price.
6. An investor buys a bond with face value \$1,000, maturing at par in 15 years, coupon rate 5%, for a price to yield 4%. He also buys a strip bond with face value \$2,000, maturing in 15 years, for a price to yield 4%.
  - (a) How much does he pay for each of these bonds?
  - (b) 2 years later, interest rates drop, and he sells both bonds to investors who wish to receive a yield of 3.2%. What prices does he receive for them?

7. A company are considering a project. The project has the following expected cash flows (all amounts are calculated at the beginning of the year):

Year	Net Cash Flow
0	-100,000
1	-10,000
2	30,000
3	40,000
4	40,000
5	40,000
6	25,000
7	40,000
8	40,000
9	40,000
10	-50,000

- (a) What is the Net Present value of the project at  $j_1 = 5\%$ ?
- (b) What is the Net Present value of the project at  $j_1 = 15\%$ ?
- (c) What is the internal rate of return?