TP 2: Bond Valuation

Exercise 1:
Consider a Zero-Coupon Bond with maturity 10 years, with YTM 8% and that will be paid back, at maturity, at its nominal value which equals 1000 euros. What is the value of this bond?

Exercise 2:
Consider a Corporate Bond with maturity 7 years and with coupons paid annually at the coupon rate of 5%. This bond can be paid back at maturity at its nominal value, that is 100 euros.
Which is the price of this bond knowing that the YTM of a similar government bond is 4% and that the market ask a premium (spread) of 200 basis points ?

Exercise 3: (optional exercise)
A portfolio manager investigates the possibility to buy a bond traded on the market with maturity 4 years and annual coupons.
Every year, the bond pays a 8% coupon.
The PM forecasts three different expected borrowing rates from the market (yield to maturity – YTM) for the bond:
-Scenario 1: 8,62%;
-Scenario 2: 8%;
-Scenario 3: 7,25%

Determine the price of the bond under each scenario.

Exercise 4:
Consider two bonds traded at par (i.e. 100% of the nominal value) with maturity of two and ten years respectively. The annual coupon rate is equal to 4% with respect to par.

1) Which is the YTM of these two bonds?
2) What will be the impact on the price of the bonds if the YTM changes by ±1%?
3) Which bond is more sensible to changes in yields?

Exercise 5:
Consider a corporate bond with maturity 2 years and 165 days rated BB+ and that is paid back at expiration at its nominal value. The coupons are annual and the coupon rate is 7%. The spread is 250bp and the interest rate on Government bonds (rated AAA) with the same maturity is 4%.

1) Which is the amount of accrued interests (ACT/365) ?
2) Which is the *dirty price*?
3) Assume that this bond is traded at the market at 99,5% of its nominal value. Is this bond over or undervalued?

Exercise 6:
Suppose that today is October 11th, 2020. You are interested in buying a bond issued by Apple which matures at the 11th of September 2024. You know that this bond pays annual coupons at a rate of 4%. You also know that markets' benchmark risk-free rate has a yield-to-maturity equal to 1% and that Apple is traded at a spread of 50 bps.

1- What are today's Apple dirty and clean prices equal to?

2- Now, suppose that **exactly** one year from now (October 11th 2021), the spread of the yield to maturity of this same Apple bond will decline by 20 basis points (the risk-free rate remains unchanged). If you decide to sell this bond at this date, what is the return that you will earn on this investment?

Exercise 7:
Assume that a bond matures in 5 years, pays 1% coupon annually, and has yield-to-maturity 1.5% (y).

1- Compute the duration (D) and the modified duration (D_M).

2- Verify that $R = \frac{\Delta P}{P} \cong -D_M \, \Delta y$.