FN211 Quiz 1

Provide precise and concise responses to the following questions referring to theories, concepts, and frameworks as discussed in the class materials and the main textbook. For quantitative problems, demonstrate the process of calculation and clearly highlight your answers as appropriate. Write down your answers clearly so that the lecturer can read them easily. If you feel that there is insufficient data, you may choose your own figures for your calculations. Please state these clearly.

1. (10 points) Answer the following questions
   1.1 (2 points) How do financial intermediaries solve the problems of adverse selection?
   1.2 (2 points) Explain the basic difference between a coupon and yield.
   1.3 (3 points) Explain how financial markets facilitate corporate finance and investment management.
   1.4 (3 points) What are the risks an investor may face when making an investment in corporate bonds? Explain three different risks.

   1.1 Adverse selection can be a problem when there is asymmetric information. For example, this can happen between the seller of insurance and the buyer. Insurance will often not be profitable when buyers have better information about their risk of claiming than does the seller. Ideally, insurance premiums should be set according to the risk of a randomly selected person in the insured slice of the population (55-year-old male smokers, say). In practice, this means the average risk of that group. When there is adverse selection, people who know they have a higher risk of claiming than the average of the group will buy the insurance, whereas those who have a below-average risk may decide it is too expensive to be worth buying. In this case, premiums set according to the average risk will not be sufficient to cover the claims that eventually arise, because among the people who have bought the policy more will have above-average risk than below-average risk. Putting up the premium will not solve this problem, for as the premium rises the insurance policy will become unattractive to more of the people who know they have a lower risk of claiming. One way to reduce adverse selection is to make the purchase of insurance compulsory, so that those for whom insurance priced for average risk is unattractive are not able to opt out.

   1.2 See lecture notes

   1.3 Businesses both invest and borrow in the money markets. They borrow to meet short-term cash flow needs, often by issuing commercial paper. They invest in all types of money market securities as an alternative to holding idle cash balances.

   1.4 See lecture notes.

2. (5 points) Answer the following questions
   2.1 (3 points) Consider a coupon bond which has a $500 par value and a coupon rate of 20%. The bond is currently selling for $1,150 and has 16 years to maturity. Calculate the bond's yield to maturity.

2.2 (2 points) Calculate the present value of a $1,000 zero-coupon bond with six years to maturity if the yield to maturity is 7%.

2.1 Bond yield to maturity can be calculated as follows.

$$1{,}150 = \frac{100}{1+i} + \frac{100}{(1+i)^2} + \cdots + \frac{600}{(1+i)^{16}}$$

Yield to maturity is equal to 6.60%

2.2 Present value of a zero-coupon bond can be calculated as follows.

$$\frac{1{,}000}{(1.07)^6} = 666.34$$

3. (9 points) A bank has given out two loans; both of them have five-year terms. The first loan is a simple loan with principal of 30 million baht for which borrowers will return 44.08 million baht in five years. The second loan equals 40 million baht with interest of 3.2 million baht per year for which borrowers will return 40 million baht to the bank in five years. Answer the following questions.
   3.1 (5 points) Calculate durations of loan 1 and loan 2
   3.2 (2 points) Calculate average duration of total loans
   3.3 (2 points) If the interest rate changes from the current rate to 5%, will the present value of total loans increase or decrease, and by how much?

3.1 Duration of loan 1 is equal to its original term of 5 years.

To calculate duration of loan 2, we first need to calculate for yield to maturity. In this case, because the face value of loan is equal to market value of loan. Yield to maturity is then equal to coupon rate or 8%. Duration of loan 2 can be calculated as follows.

$$\frac{\frac{1(3.2)}{1.08} + \frac{2(3.2)}{1.08^2} + \cdots + \frac{5(43.2)}{1.08^5}}{\frac{3.2}{1.08} + \frac{3.2}{1.08^2} + \cdots + \frac{43.2}{1.08^5}} = 4.312$$

3.2 Portfolio's duration = $\frac{30}{70}(5) + \frac{40}{70}(4.312) = 3.750$

3.3 Duration formula: $\Delta P = -DUR \times \frac{\Delta i}{1+i} \times P$

Loan 1: $-5 \times \frac{(-0.03)}{1.08} \times 30 = 4.167$

Loan 2: $-4.312 \times \frac{(-0.03)}{1.08} \times 40 = 4.791$

Total loan value **increase** = 4.167 + 4.791 = 8.958

4. (3 points) Economists have forecasted one-year T-bill rates for the following five years as follows:

Year	1-year rate
1	4.25%

2	5.15%
3	5.50%
4	6.25%
5	7.10%

Investors expect no liquidity premium in the first year, but they do expect liquidity premium of 0.25% for year 2 and 0.50% thereafter. In this case, would investors be willing to purchase a 4-year T-bond at a 5.55% interest rate?

Your required interest rate on a 4-year bond = Average interest on four 1-year bonds + Liquidity Premium

= (4.25% + 5.15% + 5.50% + 6.25%)/4 + 0.5%

= 5.29% + 0.50% = 5.79%

At a rate of 5.55%, the T-bond is below your required rate so you would not invest in this bond.