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.

1. (12 points) Answer the following questions
   1.1 (2 points) How do financial intermediaries solve the problems of adverse selection?
   1.2 (3 points) Explain the basic difference between a coupon and yield.
   1.3 (4 points) Compare and contrast the Treasury bills with the corporate bonds using four different criteria.
   1.4 (3 points) Explain how financial markets facilitate corporate finance and investment management.

1.1 Financial intermediaries can resolve the adverse selection problem in two ways. Firstly, they can require more information from borrowers when they fill their request for funds application form. Secondly, they can source credit history reports of the potential borrower from third party providers of promptness of repayment of previously undertaken loans.

1.2 Yield to maturity (YTM) is the rate of return on a bond if held until the end of its lifetime. YTM is also the rate which, when used for discounting, leads to a zero Present Value (PV). YTM is considered a long-term bond yield expressed as an annual rate. The YTM calculation takes into account the bond's current market price, par value, coupon interest rate and time to maturity. Coupon interest, on the other hand, is the actual amount of interest income earned on the bond each year based on its face value. It is fixed through the bond's maturity.

1.3 Bonds and Treasury bills can be compared based on the following criteria:

Ratings – Both corporate bonds and Treasury bills are given ratings but Treasury bills are considered safer as it is backed by the government.

Compensation to investors – U.S. bonds pay out fixed coupons on a periodic basis depending on the maturity period of the bond. Treasury bills however compensate usually on a zero-coupon basis which is the difference between the purchase price of the bill and the face value at maturity.

Volatility – Treasury bills are safer and less volatile compared to corporate bonds

Liquidity – Treasury bills are more liquid compared to bonds as there are more buyers and sellers.

1.4 Financial markets, including primary markets and secondary markets, links investors and corporations. Primary markets facilitate the issuance of new securities. Secondary markets facilitate the trading of existing securities, which allows for a change in the ownership of the securities. Financial markets channel funds from surplus units to deficit units. They connect the investment management activity with the corporate finance activity including existing operations and expansion.

2. (11 points) Answer the following questions

2.1 (7 points) Calculate the duration of a $1,000, 6% coupon bond with three years to maturity. Assume that all market interest rates are 7%.

2.2 (4 points) Consider the bond in 2.1, calculate the expected price change if interest rates drop to 6.75% using the duration approximation. Calculate the actual price change using discounted cash flow.

2.1 Solutions:

Year	1	2	3	Sum
Payments	60.00	60.00	1060.00	
PV of Payments	56.07	52.41	865.28	973.76
Time Weighted *PV* of Payments	56.07	104.81	2595.83	
Time Weighted *PV* of Payments Divided by Price	0.06	0.11	2.67	2.83

This bond has a duration of 2.83 years. Note that the current price of the bond is $973.76, which is the sum of the individual "*PV* of payments."

2.2 Using the duration approximation, the price change would be:

$$\Delta P = -\text{DUR} \times \frac{\Delta i}{1+i} \times P = -2.83 \times \frac{-0.0025}{1.07} \times 973.76 = 6.44.$$

The new price would be $980.20. Using a discounted cash flow approach, the price is 980.23—only $.03 different.

Year	1	2	3	Sum
Payments	60.00	60.00	1060.00	
PV of payments	56.21	52.65	871.3	980.23

3. (2 points) Government 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%

You have liquidity premium 0.25% for the next two years and 0.50% thereafter. Would you be willing to purchase a 4-year T-bond at a 5.75% 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 5.75%, the T-bond is just below your required rate.