TIØ4146 Corporate Finance

Fall Exam (Without solutions)

Multiple-Choice

1. A person's utility (U) as a function of its wealth (W) is given by $U(W) = 6W - 0.02W^2$. The person faces an investment with uncertain outcomes of either receiving W=40 or receiving W=100, each with a probability of 50%. The *certainty equivalent* for this investment is:
   a. 70
   b. 304
   c. 64.6
   d. 5.4
   e. 34.0

2. Which of the following options is **TRUE**?
   a. Market risk, or systematic risk, is diversifiable risk.
   b. Risk increases with the number of assets in a portfolio.
   c. The covariances between different assets returns are always positive.
   d. The portfolio variance is the weighted average of assets variances.
   e. An asset's Beta (β) is the sensitivity of the asset's returns for changes in portfolio returns.

3. Which of the following is **FALSE**?
   a. The Capital Market Line is given by combinations of the risk-free asset and the market portfolio.
   b. The graphical representation of the Capital Asset Pricing Model is known as the Security Market Line.
   c. The Security Market Line only prices the systematic risk and is therefore valid for all investment objects.
   d. The Capital Asset Pricing Model gives an expression of the required equity return
   e. The Sharpe ratio is a better performance measure than Treynor ratio when a portfolio is split into subportfolios (e.g., countries, portfolio manager).

4. Regarding the capital structure of firms, select the alternative that is **FALSE**.
   a. Modigliani and Miller proved that capital structure choice is irrelevant in a perfect capital market.
   b. The formula for the cost of equity for a company under corporate tax regime that keeps a continuous balanced debt is identical to Modigliani and Miller's second proposition for a perfect capital market.
   c. The assumption that most closely resembles what is observed in practice by firms is the periodical rebalancing of the debt.
   d. Under the Pecking Theory assumptions, firms would prefer to have cash reserves, then use debt and only issue equity when they cannot contract more debt without risking bankruptcy.
   e. The company dividend decision is relevant in a perfect capital market.

5. According to the efficient market hypothesis, select the option which is **TRUE**.
   a. The market price does not reflect expected future outcomes for a stock.
   b. Prices do not react to new information being available.
   c. Stock prices behave like random numbers.
   d. People that make money trading stock prove that the market is inefficient.
   e. Prices first underreact to new information, then overreact to compensate.

6. Choose the correct statement. Using the risk neutral valuation approach, the value of a risky asset is given by:
   a. The expected payoff, calculated with real probabilities, discounted at a risk adjusted rate.
   b. The expected payoff, calculated with risk neutral probabilities, discounted at a risk adjusted rate.
   c. The expected payoff, calculated with real probabilities, discounted at a risk-free rate.
   d. The expected payoff, calculated with risk neutral probabilities, discounted at a risk-free rate.
   e. None of the above.

7. Which one of following statements about the binomial pricing model is FALSE?
   a. The market is complete if two linearly independent securities are traded.
   b. The non-arbitrage condition is d<r<u.
   c. The market risk is embedded in the risk neutral probabilities.
   d. It is a discrete time model.
   e. It can only be used to price put options.

8. The holder of a put option has:
   a. the obligation to sell a security for a given price.
   b. the right to buy a security for a given price.
   c. the right to sell a security for a given price.
   d. the obligation to buy a security for a given price.
   e. None of the above.

Open-Questions

1. Newpower Ltd produces power from offshore wind. Other companies producing offshore wind has and an equity beta of 1.2, Newpower Ltd has the same level of debt- to-equity ratio as other offshore wind power producers.

   a. Determine the expected return on Newpower's shares if the expected return of the market is 8.0 per cent and the risk-free rate is 2.0 per cent.

   b. Newpower's shares are priced according to the net present value of the infinite streams of future dividend payments. The company expects at the end of 2023 to pay a dividend of 2.00 euros by end of 2024 and further expects its dividend growth rate to be 5.0 % in the future. What should be a fair price of Newpowers shares?

   c. Newpower consider investing in solar power. Solar power production is riskier, and the beta for firms operating in solar power is 1.8. Comparable solar power firms have a debt-to-equity (D/E) ratio of 1/3 which can be assumed to be the fixed D/E ratio target for such firms. Firms investing in solar power projects can issue debt at 3.0 per cent and they face a company tax rate of 25 %. Given these assumptions, what is the weighted average cost of capital for investing in solar power?

2. The expected free cash flow of company A is $5 million each year. Company A also has $19.05 million in outstanding debt, which is expected to be maintained permanently. Company B is a similar company with the same expected cash flow as Company A, and no debt. The cost of capital of Company B is 15%.
   a. Calculate the value of Company B.
   b. Assuming that corporate tax rate is 21%, calculate the value of Company A's tax shield, the company value, and its capital cost.

3. Consider a manufacturing plant that currently has discounted cash flows evaluated in 8 million Euros. According to the market conditions the discounted cashflows can go up by 25% or down by 20% with (real) probabilities 0.7 and 0.3, respectively, in one year. Assume that the yearly risk-free discount rate is 7%.
   a. Assume that the plant can be sold at any time to a larger company for 7 million Euros. Present the evolution of the discounted cash flows in a two-period model, where each period corresponds to a one year. Calculate the value of the project when one considers the abandonment option.

   b. Assume now that the plant can only be sold at time 2 at a price of 7 million euros. How does this impact on the project value calculated in point **a.**

4. AAA Transcontinental's stock has a volatility of 25% and a current stock price of 40 Euros per share. AAA pays no dividends. The risk-free interest rate is 4%.
   a. Calculate the Black-Scholes delta of a one-year, at-the-money European call and a put options on AAA stock. Interpret this value.

   b. Calculate the Black-Scholes value of a one-year European put option on AAA stock with a strike price of 50 Euros.

   c. One of the determinants of the European call and put option prices is the strike price. Increasing the strike price leads to variations in the options price. How do both the European call and put option prices change with the strike price? Explain why.